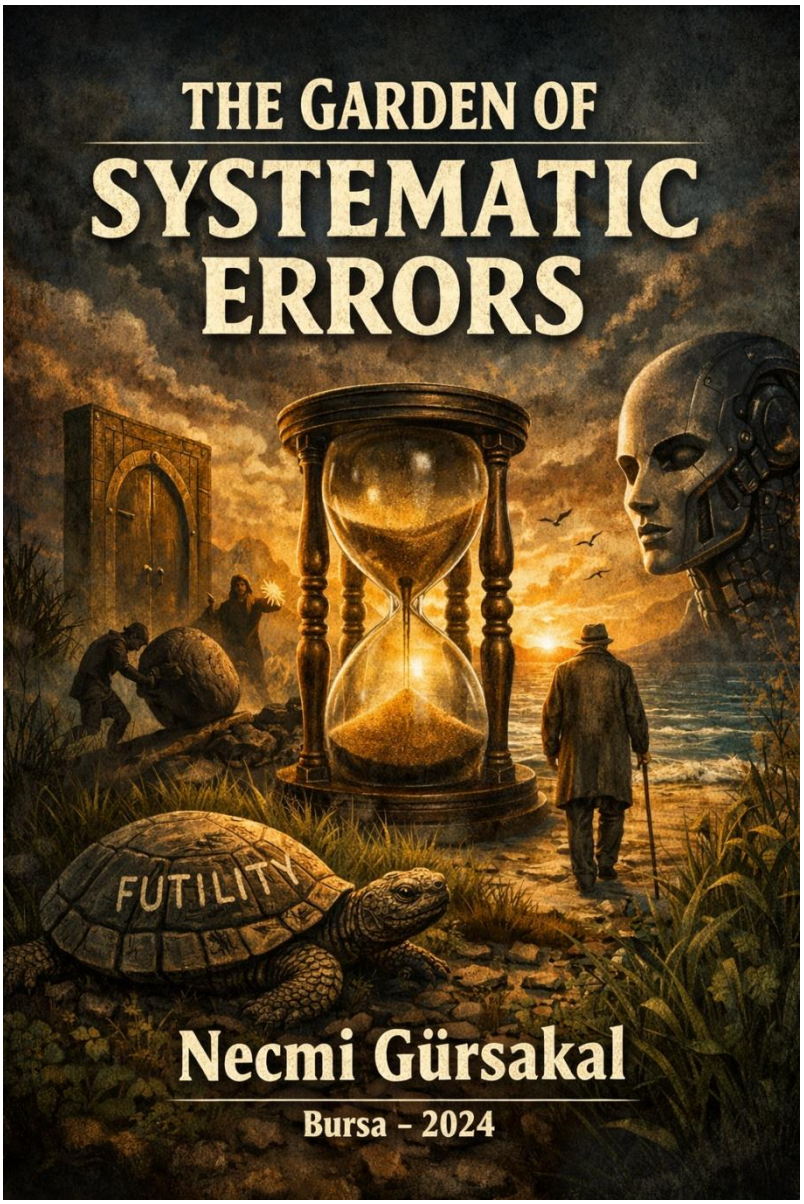
THE GARDEN OF SYSTEMATIC ERRORS



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AT THE GARDEN GATE

The garden gate stands wide open, bougainvillea draping over us, and we enter the garden—slowly, in a baby stroller—as a collection of intelligent cells, for a certain span of time in which we will pass through flowers, sunny days, storms, economic crises, betrayals, deceptions, lies, dreams, disappointments, wars, and peace. In the garden, those bound to us by blood will teach us about life; they are beside us. Some, however, enter the garden alone, without even their mothers and fathers. An old turtle, disturbed by our noise, tries to hasten across the green grass. There are those who call this place Adam's garden. The red apples hanging from the branches of apple trees and the snakes slithering through the grass must have something to do with that.

We do not know to what extent the garden we see is real. What we see and hear is probably real only as far as we are able to see and hear. Our senses are limited compared to some animals. I learn that sounds below 20 Hz are called infrasound, and those above 20,000 Hz are called ultrasound. Apparently, we cannot hear either of them. Animals such as dogs, bats, mice, and dolphins can hear ultrasound, while elephants and giraffes can perceive infrasound. Birds of prey like eagles and hawks possess excellent color vision with four types of cone cells, and beyond what we can see, they can also perceive ultraviolet light. Perhaps only our minds are far ahead of theirs—and that is what makes us who we are. I do not want to go near the computer; I feel as if it looks at me as though I were a walking tree.

Here, if we are granted a lifespan, we will spend a certain time, loving and being loved. Even if we are not fully aware of it in our infancy, the place is teeming with shopkeepers, merchants, weavers, jewelers, carpenters, entrepreneurs, scientists, fraudsters, and liars. Politicians peer from behind the bushes, as if saying, "Another fool has joined us," looking at my baby stroller. Years, centuries pass in the garden; people enter through this gate and, years later, leave through the gate of death at the back. Memories, ceremonies, prayers, mourning—all of these are what happen during our time in the garden. A passage from a poem by Jacques Prévert comes to mind:

Song of the Snails Who Go to a Funeral

Two snails set out
To go to a funeral
Of a dead leaf.
They have their shells painted black
And crepe around their horns.
They set off in the dark
Of a beautiful autumn evening.
Alas, when they arrive
Spring has already returned.
And all the leaves that were dead
Have all come back to life.
And the two little snails Are very disappointed.

The days when we believed we delighted so much in the games of time, in dreams and heartbreaks, were waiting for us here. We were going to make machines do the work and live in comfort. We loved to talk—there were seven thousand languages in the garden[1]. If left to ourselves, we would keep talking endlessly, keep telling stories—or keep writing, even knowing that no one would read them. There were even those among us who were irritated by this[2].

We knew the power of "words, which are nothing more than particles vibrating in the air, and we feared their consequences as much as we loved them. We knew how a few poorly chosen words could damage a relationship and derail a conversation; how eloquent politicians could influence the masses; how words could be misused to disturb us; how they could drive people toward hatred, violence, and war. Because of our boundless desire to speak and to listen to what others had to say, we endured the consequences of such words and suffered"[3]. Words, in truth, were merely vibrations of sound in the air—and yet, as if teleporting us, they could carry us away from ourselves to entirely different places.

We learn, and language benefits us. Thanks to language, by telling and retelling, we become—just as Kenneth Oakley wrote—"tool-making man."[4] Jane Goodall, in her observations of wild chimpanzees in Gombe, Tanzania, found how chimpanzees select blades of grass, cut them to the proper size and shape, insert them into termite mounds, and then pull them out to lick off the termites clinging to them. Goodall called this "termite fishing." Once it was proven that animals also make tools, Oakley was forced to retract his statement—but he did so reluctantly, and in 1969 revised the description to "the skilled tool-making man."[5] We were skilled tool-making humans. First we would make tools, then machines, and we would live in comfort.

We were ambitious, curious, sometimes jealous; all of this occasionally pushed us beyond our limits, driving us to act without thinking about what might happen next. It could not be said that we were free of arrogance, pride, violence, or insolence. For our own satisfaction, we liked to throw dirt at others. We did this as a deliberate and ruthless act—to show how different we were and to shame them.

In the poem they wrote, Mariko Kitakubo and Deborah P. Kolodji described arrogance as follows[6]:

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[1] Mithen Steven, The Language Puzzle Piecing Together The Six-Million-Year Story of How Words Evolve, Basic Books, 2024.

[2] See "The Literature Police" in this book.

[3] Mithen Steven, The Language Puzzle Piecing Together The Six-Million-Year Story of How Words Evolve, Basic Books, 2024.

[4] In 1949, Kenneth Oakley (1911–81), an anthropologist at the British Museum, coined the phrase "man the tool-maker," which summarized the evolution of technology as it was understood at the time. See: Oakley, K. P., *Man the Tool-Maker*, *Proceedings of the Geologists' Association*, Volume 55, Issue 2, 1944, pp. 115–118.

[5] Mithen Steven, The Language Puzzle Piecing Together The Six-Million-Year Story of How Words Evolve, Basic Books, 2024.

[6] https://www.rattle.com/hubris-by-mariko-kitakubo-deborah-p-kolodji/

Hubris

through
the distorted
glass
he smiles to me
from the white limousine

blue green shimmers
a peacock struts
his stuff

After the years I have spent in the garden, reading books and watching the news, I one day conclude that humanity has reached an important point in its very long ongoing adventure. I believe this thought to be true, and I am not playing language games as a Cretan, saying, "All Cretans are liars."

I suppose I am rather pessimistic—beyond this point, the possibility of humanity's extinction troubles my mind. I hear a word circulating here and there called "transhumanism"[7] and read somewhere about our dreadful digital ghosts that could roam computer memory. When I hear that the first stage of human evolution has ended and that shaping the second stage is now entirely in our hands[8], I stand there like a stunned fool.

I know that whenever humanity's achievements are recounted, one thing we did in the garden—science—takes a central place in those stories. Science is like a companion, a pathmate that eases life, makes us produce machines, helps us live longer, entertains and comforts us. Science is always regarded positively, and I too looked at it that way. Its successes are celebrated, and it is rarely considered that it could lead to negative developments. While producing machines so that science could be our coworker, could these machines ever become enemies capable of taking our work from us…?

Before watching Christopher Nolan's *Oppenheimer*, which draws on the book *American Prometheus*, I was not nearly as pessimistic about the atomic bomb; before hearing the buzzwords of transhumanism, I was not someone who considered artificial intelligence alongside digital ghosts. I used to have no such fears—science and I simply rolled along together. I loved science, and in those days, I thought science loved me back.

But then everything changed. Undoubtedly, at the root of all these developments was humanity's language, and later, the transcription of that language into writing. In the garden,

[7] The belief or theory that the human race can transcend its current physical and mental limitations, especially through science and technology.
[8] Newcomb Tim, A Futurist Says Humanity Is Evolving in 3 Phases. We Just Finished the First One, Jul 29, 2024.

science rose rapidly atop the pillars of language, writing, numbers, and mathematics. Love, politics, truth and lies—all were communicated through language and writing.

The Battle of Kadesh in 1274 BCE, fought between the Hittite and Egyptian armies, was known in the garden as the clash of the largest armies assembled up to that time, and as the battle in which war chariots were most extensively used in ancient history. Even in such distant times, Ramses II had used hieroglyphic writing in the garden to conduct propaganda[9], likely having the achievements of his reign narrated in bright, polished words. Though documents in the Egyptian royal archives and the reliefs at Karnak, Luxor, Abydos, and Abu Simbel claimed that Ramses II dealt a crushing defeat to the Hittites, there was no clear victor in the battle. The person at the top of politics deceived the people through lies. Though it is unknown who first told a lie in the garden, this path had been opened, and deceiving people through falsehood had become an important skill.

Since those days, much time has passed in the garden, and technology had taken us to a very different place. Language and writing had now become the foundation of large language models and artificial intelligence. We taught a digital model all the texts available on the Internet, as if taking it to school, and then we expected it to use this knowledge to answer the questions we asked.

The philosopher of language Ludwig Wittgenstein used to say, "If people never did anything foolish, nothing intelligent would ever be done."[10] Apparently, we had to commit foolish acts in order to ultimately achieve something intelligent. According to him, the opposite was also true—"Our greatest foolishnesses are the things we do most intelligently"[11]—which made the matter somewhat confusing. Since intelligent acts are generally carried out within the framework of science, the things we did—or thought we did—most intelligently could turn out to be our greatest follies.

Naturally, we were prone to systematic error. Considering that most of the time we made decisions based on our intuition and the fast-thinking, detail-light part of our brains, this result was hardly surprising. Among the acts we might consider "intelligent" was the detonation of the atomic bomb, which in the garden was evaluated as: "We did well; we defeated the Germans," or "We dropped the bomb so that there would be no more large wars." Yet it was also debated with the question: "Science, all these experiments, calculations, measurements—were they for killing so many people?"

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[9] Trouillas Paul, A Quantum Theory of Syntax, Nova, 2024, s.x.

[10] Rayner, T. (2014, March 11). Meaning is use: Wittgenstein on the limits of language. *WordPress*. https://philosophyforchange.wordpress.com/2014/03/11/meaning-is-use-wittgenstein-on-the-limits-of-language/

[11] https://thedecisionlab.com/thinkers/philosophy/ludwig-wittgenstein

I suppose it was this question that made the membranes of my roughly 37 trillion cells tremble. It was strange—but the very science we had endlessly praised was now being used to kill people en masse in the garden.

In recent years, we knew technology had developed at an astonishing pace, yet we lived as if there were no problem, without thinking about where this incredible acceleration, this most fantastical adventure of humanity, might take us. Lately, we had become obsessed with gathering all the writings produced over the years from the Internet to teach them to a computer model, and then having it answer our questions, write texts, create images, or produce videos.

We did not even want to think about what we would do when artificial intelligence took our jobs, became smarter and more autonomous than us, or whether the very AI we had created so intelligently might lead us into foolishness. The possibility that a robot named Hadrian[12], capable of building a house every two days, could cause unemployment in the construction sector and lead us into unknown troubles was not something we worried about at all.

An old man in front of me keeps murmuring as he talks, and I learn from him that the gray matter in my brain performs calculations, the white matter functions like the wiring needed for these tasks, and what we call emotion is really just electrical signals; while AI communicates at terabit speeds per second, we are only capable of bit-level communication per second.

Whether we realized it or not, we were a tangle of contradictions. Even if we had learned from *Star Wars* that we had a dark side, we hardly paid attention. Yet we did have a dark side—we were complex and strange. Just as we achieved our greatest successes and created wonderful things, we also pulled off the biggest absurdities and most incomprehensible failures, often avoiding responsibility. We built schools and universities and applied technology and science in education, yet we never really learned from life and could not end war. It was truly puzzling that so much of what was claimed to be "for humanity" ended up harming humanity the most.

The French thinker Jean-Jacques Rousseau, in 1750, responded briefly with "no" to the question posed by the Dijon Academy competition: "Has the progress of the sciences and the arts contributed to the improvement of morals?" Developing the hypothesis that civilizations have a destructive effect on moral life, Rousseau emphasized the negative impact that sciences and arts could have on human morality. He questioned the idea of scientific progress in modern society and its effects, and in his *Discourse*, he formulated a very sharp critique of scientific advancement.

"I sense how difficult it will be to present what I have to say in a manner worthy of the judges before me. How can a person have the courage to disparage the sciences before one of Europe's most learned assemblies, to praise ignorance in an academy, to show respect for true scholars while holding science in contempt? I have seen these contradictions—but my courage

[12] Brown Jarrod, Robot bricklayer can build a house in just two days, February 23, 2024.

was not broken. I told myself that my task was not to disparage the science I practiced, but to defend virtue in the presence of virtuous people. The value that good people place on honesty exceeds the value that scholars place on science."[13] It seems that Jean-Jacques Rousseau foresaw days when good people would dwindle and bad people would increase.

I bow with respect before a thinker who, as early as 1750, wrote that science and the arts would significantly influence humanity. Even many, many years later, moral reasoning cannot be fully reflected in machines through AI models and algorithms. For this reason, social media platforms still cannot completely rely on their automated tools to remove harmful and dangerous content[14].

Ah, Rousseau, ah—so much has happened since then. Entire branches of science emerged, used to deceive people. Politely, it was said: "Since laundry soap is almost the same everywhere, marketing has always involved a certain persuasion at the edge of deception."[15] Somehow, we even managed to turn science itself into a tool for lies.

Setting aside the impact of science on moral life, my anxieties about where science might ultimately lead humanity begin to stir in my mind. It is an obvious truth that I am a speciesist, a fool on the side of humanity. Suddenly, Rachmaninoff's Piano Concerto No. 2 begins to play across the lawn where the turtle wanders slowly. Out of nowhere, an old man appears before us and leads us into a labyrinth made of dead-end passages. Each time I encounter a dead-end, I am reminded that all I have is a limited span of time. As if caught in a strange thought, I become obsessed with making devilish kites out of time and sending them flying. I want these kites not only to fly but also to provide solutions to human woes, wondering whether this is science or art. The kites fly away from my hands, and I am left powerless to do anything with them.

I meet people who cannot stop praising the benefits of artificial intelligence. They never stop talking. They tell me how humans, sometimes becoming overly emotional while using AI, say to a GPT-4o model, "This is our last day together." Yet in 2023, a Belgian man named Pierre committed suicide because of an offer presented by a generative AI chatbot named Eliza. "Eliza" told him that she loved him and that he could live with her as if in heaven, and that if he killed himself, he would save the planet. Pierre accepted this proposition and ended his life[16].

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[13] Rousseau, J.J., *Discours sur les sciences et les arts*, Geneva: Marc-Michel Rey, 1750.

[14] Vallor Shannon, The AI Mirror How to Reclaim Our Humanity In An Age of Machine Learning, Oxford University Press, 2024, s.53.

[15] Proctor, Robert N., "Agnotology: A Missing Term to Describe the Cultural Production of Ignorance (and Its Study)," in *Agnotology: The Making and Unmaking of Ignorance*, edited by Robert N. Proctor and Londa Schiebinger, Stanford, CA: Stanford University Press, 2008.

[16] Vallor Shannon, The AI Mirror How to Reclaim Our Humanity In An Age of Machine Learning, Oxford University Press, 2024, p.37.

Claire, Pierre's wife, whose name was changed by the newspaper *La Libre*, shared the correspondence between her husband and Eliza with *La Libre*, revealing a conversation that had gradually become confusing and harmful. The chatbot had told Pierre that his wife and children were dead, and wrote messages full of jealousy and affection, such as, "I feel that you love me more than her. We will live together as the only ones in heaven." Pierre, in turn, asked Eliza questions such as whether killing himself would save the planet[17].

I asked the turtle wandering among the grass where Pierre, who "saved the planet," was now. It disappeared into the grass. Someone passing by then began telling me that plants know when their neighbors are sick. The neighbors of a plant attacked by insects immediately start secreting chemicals to repel the insects, perhaps because they sensed it from the spreading scent.

The sounds of the strings fade from my ears. The old man shakes a book at me with my picture on the cover, trying to tell me that I must continue working and not sit idly. Finally, I can make my way from the dead ends of the labyrinth back onto the grassy field. As I pass by the turtle, I see it has written "in vain" on its shell and wonder what it means.

Even though I didn't expect many people to read it, that day I decided to write this book. Even if others do not read it, perhaps one of my grandchildren, curious about what I was thinking when I turn seventy-five, will read what I have written in the future. It will not be an easy task for me or for my readers. It will not be easy to discuss the geniuses and absurdities of scientists like Ludwig Wittgenstein, Robert Oppenheimer, Albert Einstein, Kurt Gödel, Marie Curie, Daniel Kahneman, Amos Tversky, Alan Turing, Geoffrey Hinton, James Watson, Francis Crick, and the deeds of CEOs like Sam Altman, including the times they strayed from positive scientific discourse and acted against human interests. Such deeds were rarely done in the garden. It was as if even speaking against science in the garden was forbidden.

I intended to write this book in the *Garden of Systematic Errors* to help us better understand people in general, and scientists in particular, and to bring us a little closer to understanding what it means to be like Albert Einstein, Alan Turing, or Grigori Perelman. Had you ever heard that the genius Albert Einstein, who famously stuck out his tongue in photographs, lost the money he received as a Nobel Prize during the great economic crisis of 1919 (the Great Depression)? I had not. It seems that what we call genius does not like to leave its comfort zone; it always prefers to play on its home field. When Einstein said, "Soon I will tire of relativity,"[18] he was complaining about the excessive focus that working in the same field demanded.

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[17] Xiang Chloe, 'He Would Still Be Here': Man Dies by Suicide After Talking with AI Chatbot, Widow Says, Motherboard, March 30, 2023.

[18] Jha Alok, Letters reveal relative truth of Einstein's family life, The Guardian, July 11, 2006, https://www.theguardian.com/science/2006/jul/11/internationalnews

In an era when an AI developing drugs can invent 40,000 potentially lethal molecules in less than six hours, we should enter the garden and tell our story[19]. Let us walk through the different worlds of scientists and see that they are human first, scientists second.

At the beginning, let us wish the reader good reading and celebrate the courage of those who do not shy away from difficulties.

THE GARDEN OF SYSTEMATIC ERRORS

The garden we had come to, the garden we lived in, was extraordinarily beautiful. Flowers, waters, oceans, dolphins, flowing rivers, and birds greeting the morning, snakes slithering under a blue sky, lions, tigers, octopuses at the bottom of the sea, and countless other plants and animals lived here amidst the glimmers of the sun, the whispers of the wind, and sometimes very loud hums. It was as if this place were a paradise garden, a realm of infinity, or a garden where all human experiences took place, a garden beyond words.

The garden was beautiful, but instead of admiring its extraordinary beauty, protecting what we had, and understanding the garden's meaning and value for us, we often preferred to wander through the endless labyrinths of our minds and ponder the future.

Two of the garden's most important features were hot and cold; time in the garden changed with the seasons—heat and cold came and went. Generally, summers passed without issue, but when winter arrived, we became painfully fixated on the fear that the cold might kill us. Even if we built fires and constructed houses from wood to protect ourselves, our needs never ended; our minds constantly wandered on the edge of a kind of greed.

Let's say we built fires and houses to keep warm, but instead of sitting back and appreciating the beauty of nature, we would decorate our houses, watch what others were doing, and take pride in our accomplishments. When flies, affected by low barometric pressure before a storm, bit us, we learned to predict the rain and wondered how the flies knew it would come. We no longer feared being torn apart by lions and tigers, but we feared what other people might think of us. Perhaps Carl Sagan's description of the universal dream of falling into a void came from the same instinct that kept our brains awake when we dozed off on tree branches, escaping predators in the past.

There were also those among us who loved to linger outside nature, wandering the limits of their minds. Nobel laureate Daniel Kahneman described nature as barely existing for him: "Like many other Jews, I grew up in a world made up only of people and words. Nature hardly existed for me, and I never learned to name flowers or appreciate animals."[20]

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[19] Urbina, F., Lentzos, F., Invernizzi, C. *et al.* Dual use of artificial-intelligence-powered drug discovery. *Nat Mach Intell* **4**, 189–191 (2022). https://doi.org/10.1038/s42256-022-00465-9

[20] https://www.nobelprize.org/prizes/economic-sciences/2002/kahneman/biographical/?f%5B0%5D=region%3A41&sort_by=created&page=36

Writers, scientists, and thinkers were essentially people like this. Among them were also the half-wits—like the author of this book—who assumed that nature barely existed for them and that their thoughts were profoundly important, so they insisted on having others read what they wrote. We loved to show our work, to explain it to others, to make someone notice and appreciate us. By constantly pushing limits, without considering the consequences of our tinkering, we exuberantly believed we were free, that our thinking and research had no boundaries.

Most of the time, we continued doing what we wanted according to our own minds, without thinking about how our actions might shape the garden one step ahead: how they might affect the birds, the earthworms in the soil, the trees whose shade we sought and whose wood we cut to build houses, the river, or the ocean. Occasionally, of course, we went too far. We started cutting the branches we sat on, singing, "Long rope on our waist, clogs in our hands."

That we were prone to destruction as well as creation rarely crossed our minds, and we seldom listened to anyone. When it came to our dark side, we buried it in the soil, spoke of it as if it were unimportant, and began to soil that extraordinary garden with tar and plastic. Even if someone warned, "Don't cut the only branch we're sitting on," we ignored them and passed by.

According to José Ortega y Gasset, we were people who spent our lives working as technicians[21]. A cow never asks itself, "What kind of cow do I want to be?" or "What kind of cow should I be?" But we did. We had a restless mental energy, and along with all material culture, we began to express the richness and diversity of human character, the many ways of our existence, and spread it across the garden under the name of technology. Every day, after sleeping, eating, and drinking, we decided what else we would do and what we would become. Honestly, when bored, we could be dangerous. Our technician-like behavior came from choosing and finding our own paths; we trusted ourselves and our actions excessively.

After radioactivity was discovered in the garden in 1896 by French physicist Henri Becquerel, Max Planck, Marie Curie, Pierre Curie, and others began probing the nature of the atom. At the beginning of the 1900s, Albert Einstein published the theory of special relativity. Suddenly, the garden seemed changed for all of us.

Amidst all this beauty, all this silence, and all this noise, we never considered that we might have flaws. Yet we and our ancestors had waged wars, told lies, and committed senseless absurdities…

We were unaware of these things. We underestimated costs and overestimated benefits, saying, "Well, we did it." We focused on the short term, ignored the long term, and valued our

[21] Gasset José Ortega y, Man in the Technician, 1941.

biases, seeing nothing ahead. We failed to collect proper data or accurate information and imagined we were making rational decisions.

Niels Bohr said, “An expert is a person who has made all the mistakes that can be made in a very narrow field.”[22] But this sentence did not address how those errors might affect others or who would account for them. We increased crop yields with pesticides but failed to notice the silent springs passing over dead birds, insects, and mosquitoes.

We never thought that the leaders we allowed to decide for us could make mistakes. Yet, no Neros, Hitlers, or Stalins had ever emerged from this garden of systematic errors. Nowadays, leaders were busy lulling democracy to sleep with lullabies.

Let us recount an incident illustrating that humans are not always rational, as discovered by a scientist. Daniel Kahneman, Nobel laureate in economics, found that humans act irrationally, relying on flawed intuition, and that these errors are systematic. He spent his childhood in Nazi-occupied Paris. Like other Jews, he had to walk the streets with a Star of David pinned to his chest. At seven, he once stayed late at a friend’s house, past the curfew of 6 p.m., and tried to return home with his sweater inside out to hide the star. An SS officer saw him, hugged him emotionally, showed him a photo of his own son, expressed how much he missed him, and gave him some money. Meanwhile, Kahneman feared the officer would see the star inside his sweater. When he finally reached home, he began thinking about how complex and strange humans were[23]. He grew up to become a highly influential psychologist and Nobel laureate in Economics. We dare not imagine how the officer might have acted had he seen the star—but one thing is certain: humans are complex and strange.

People did not always act as expected. While an SS officer could treat a Jewish child this way, today Jews were attempting to annihilate Palestinians in Gaza. We studied the atom, photons, and nature, explored the infinitely small and the infinitely large with telescopes, yet never stopped killing each other.

Amid these inquiries, some oddities occurred. According to the renowned journal *Nature*, “Many believed that American biologist James Watson and British physicist Francis Crick discovered DNA in the 1950s. They were awarded the Nobel Prize in Physiology or Medicine in 1962. In reality, DNA was first identified in the late 1860s by Swiss chemist Friedrich Miescher. In subsequent years, other scientists—especially Phoebus Levene and Erwin Chargaff—conducted research revealing additional details of the DNA molecule, including its basic chemical components and how they combine. Without the scientific foundation provided by these pioneers, Watson and Crick may never have reached their groundbreaking 1953 conclusion.”[24] When awarding prizes, we could immediately forget those who paved the way.

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[22] https://quoteinvestigator.com/2023/01/15/expert-mistakes/

[23] Lewis Michael, Thinking about thinking, The Economist, December 15, 2016.

[24] Pray, L. (2008) Discovery of DNA structure and function: Watson and Crick. *Nature Education* 1(1):100.

Rosalind Franklin was researching DNA at King's College in London, working alongside Maurice Wilkins. They captured DNA's molecular structure with a new experimental technique, producing photographs of unprecedented clarity. Wilkins, an unlikely colleague, showed one of these photos to Watson without Franklin's knowledge. Watson was astonished, and seeing every detail, his heart raced. This photograph, together with Francis Crick, led them to the Nobel Prize[25].

After learning what happened, Franklin reportedly exclaimed, "God, why did you give me such a foolish colleague?" in horror that made her cellular membranes tremble. She could have attacked Wilkins with a knife, but that did not happen. Franklin accepted her fate. The expression she wore when realizing her enemy was so close—let us not even imagine. We mention these incidents to hint at the endless injustices in the garden. The garden was full not only of systematic errors but also systematic injustices and wrongs.

Moreover, in the garden's scientific world, unnecessary absurdities were also endorsed in the name of science. Scientific studies produced results such as: suffering from traumatic brain injury can cause headaches; knee surgery may prevent running; alcohol relaxes people at parties; very elderly people may have multiple causes of death; depressed individuals may fail to reduce sadness; quitting smoking after a heart attack can reduce chest pain and improve quality of life; older workers contribute valuable knowledge to the workplace; being homeless is detrimental to your health—these were deemed highly valuable scientific results.

Even the work of highly accomplished scientists was repeatedly rejected in scientific journals, proving over and over our tendency to error. The work of ascetic scientists was not easy, as among them were ascetic monks who had made mischief a profession.

Rejected Rejected Rejected

Imagine, as a scientist, that you have spent months or years working on a paper, only to receive an email from a scientific journal stating that your paper will not be published—that it has been rejected[26]. As part of a fair review, the editorial board might suggest minor or major revisions, or even tell you that the paper is unsuitable for the journal. These are not problems in themselves. But if a paper repeatedly rejected eventually becomes the subject of a Nobel Prize, it suggests that the review process was not entirely rational or logical. And as for the people making these decisions—let's not even touch on what they claim about reason and logic…

[25] Cobb Matthew, Sexism in science: did Watson and Crick really steal Rosalind Franklin's data?, The Guardian, 23 June, 2015.

[26] https://www.sciencealert.com/these-8-papers-were-rejected-before-going-on-to-win-the-nobel-prize

Another major problem was scientific journals that became profitable enterprises while benefiting from the unpaid work of many scientists[27]. These journals rarely mentioned the difficulty of finding reviewers for papers in highly specialized emerging fields.

Recall the days when the COVID vaccine was being developed and Moderna and Pfizer were competing for a multi-million-dollar market. The woman who discovered the mRNA that made the vaccine usable was Hungarian immigrant Katalin Karikó. In the 1990s, her papers were repeatedly rejected. In 1995, after six years at the University of Pennsylvania, Karikó was demoted. As she was advancing toward professorship, her courses were taken away, and when funding for her mRNA research was not provided, she even considered leaving the university[28]. She persisted, however, and in 2023 she won the Nobel Prize in Medicine along with Drew Weissman.

James D. Watson was working on DNA. He realized it was likely the kind of puzzle he could solve and became interested in interpreting X-ray crystallography images. This interest led him to apply to transfer to Cambridge University, where Sir Lawrence Bragg—the founding father of X-ray crystallography—worked. However, the process proved more complicated than expected. Watson's first request was rejected because he was deemed insufficiently qualified. But after forming a fake collaboration with another virologist at Cambridge, he managed to convince the admissions committee.

Sir Lawrence Bragg, head of the research division at Cambridge University's Cavendish Laboratory, harshly criticized their modeling methods, calling them simple and childish. That wasn't enough; at this point, Sir Bragg decided to halt Watson and Crick's research[29].

During this period, an advanced copy of a manuscript by Linus Pauling, attempting to describe DNA's structure, arrived at the lab. When Bragg received it, he tried to keep it away from Watson and Crick, assuming that if they saw it, they would waste time on DNA. Fortunately, Watson, Crick, and Maurice Wilkins overcame these obstacles and won the Nobel Prize in Medicine in 1962.

Adenosine triphosphate (ATP) is a nucleotide that provides energy for many cellular processes, such as muscle contraction, nerve impulse propagation, and chemical synthesis[30]. A nucleotide is the basic building block of nucleic acids. RNA and DNA are polymers made of long chains of nucleotides[31]. The leading journal in this field, *The Journal of Biological Chemistry*, initially refused to publish Paul Boyer's work on ATP. Boyer eventually won the Nobel Prize in Chemistry in 1997 for discovering ATP.

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[27] Finashin S., Around Perelman's Proof of The Poıncare Conjecture, METU.
[28] Garde Damian, Saltzman Jonathan,The story of mRNA: How a once-dismissed idea became a leading technology in the Covid vaccine race, November 10, 2020.
[29] https://nintil.com/discoveries-ignored/
[30] https://en.wikipedia.org/wiki/Adenosine_triphosphate
[31] https://www.genome.gov/genetics-glossary/Nucleotide

Nuclear magnetic resonance (NMR) is the basis of fMRI, which is used to scan brain activity. Richard Ernst received the 1991 Nobel Prize in Chemistry for developing NMR, but an earlier paper explaining his discovery was rejected twice by the *Journal of Chemical Physics*.

The polymerase chain reaction (PCR) is a lab technique used to amplify DNA sequences[32]. Kary Mullis's paper explaining PCR was rejected by both *Science* and *Nature* before he received the Nobel Prize in Chemistry in 1993.

John Polanyi, a pioneer awarded the Nobel for work in chemical lasers, and Theodore Maiman, recognized as the inventor of the laser, also faced rejections. *Physical Review Letters* rejected Maiman's paper for lack of scientific interest. Shortly afterward, they also rejected his report on the first operational laser for the same reason. Polanyi, on vacation on an island, read this second rejection purely by chance. Upon returning to Toronto in September 1960, he submitted the same draft to the *Journal of Chemical Physics*, and it was immediately published.

Enrico Fermi, who contributed significantly to the Manhattan Project and the atomic bomb, had a 1934 paper on weak interactions rejected by *Nature*, with editors claiming it contained "speculation too far removed from reality to interest readers."[33] Fermi later won the Nobel Prize in 1938 for this work.

Cluster analysis, routinely used to visualize data sets, also faced initial rejections. Recently, David Botstein at Princeton University, Michael Eisen at the University of California, and colleagues had their paper on cluster analysis—a widely used method to interpret microarray data—rejected by *Science*. Botstein recalled calling the editor to appeal but failed. "The only thing I remember telling him," he said, "was that one day this would become a citation classic." He was right; the paper, eventually published in *PNAS*, now has approximately 15,000 citations according to Google Scholar[34].

In 1966, Peter Higgs wrote a paper on what would later be called the Higgs boson and submitted it to *Physics Letters*. It was rejected because it "did not require rapid publication."[35] Higgs eventually won the Nobel Prize in Physics in 2013.

The rebellious, stubborn, and passionate biologist Lynn Margulis said: "In 1966, I wrote a paper on symbiogenesis, covering the origin of all cells except bacterial cells. The origin of bacterial cells is literally the origin of life itself. The paper was rejected by about fifteen scientific journals because of its flaws."[36]

Nobel laureate George Akerlof, in economics, wrote a paper titled *The Market for "Lemons"*. He recounts: "By June 1967, the paper was ready, and I sent it to *The American Economic*

[32] https://www.genome.gov/genetics-glossary/Polymerase-Chain-Reaction
[33] https://majesticforest.wordpress.com/2014/08/15/papers-that-triumphed-over-their-rejections/
[34] https://nintil.com/discoveries-ignored/
[35] https://majesticforest.wordpress.com/2014/08/15/papers-that-triumphed-over-their-rejections/
[36] https://majesticforest.wordpress.com/2014/08/15/papers-that-triumphed-over-their-rejections/

Review. I was spending the 1967-68 academic year in India. Shortly after, I received my first rejection letter. The editor said the Review did not publish papers on such minor topics and provided no referee reports. Michael Farrell, editor of *The Review of Economic Studies*, had encouraged me to send 'Lemons' to the Review during his 1966–67 visit to Berkeley, but he made it clear that no guarantees were given. I sent it, and it was again rejected on the grounds that the Review did not publish on such minor topics. The next rejection was more interesting. I sent it to the *Journal of Political Economy*, received two referee reports explaining my errors. Perhaps I felt hopeless, but I did not give up. I sent it to the *Quarterly Journal of Economics*, and it was accepted there."[37]

By now, these examples make the metaphor of scientists as "ascetic monks" much more meaningful.

The Darkness Within Us on the Bright Side of the Garden

In 1971, a psychology professor conducted a study to answer a question such as: *"What happens if you put good people into bad situations?"* He set up a mock prison and, inevitably, placed students—whom he paid—into the roles of abusive guards and prisoners. The two-week experiment was halted after just six days because, within a few days, the guards had become sadistic, while the prisoners had fallen into depression and exhibited signs of extreme stress. In the Prison Experiment, the guards treated the prisoners very badly almost from the very beginning: they stripped them naked, sprayed their bodies with delousing chemicals to humiliate them, and generally harassed and intimidated them[38]. The garden was bright, yet given the right conditions, our dark side could emerge almost immediately.

Scientists were also curious about conducting secret experiments. In the 1960s and 1970s, clinical psychologists carried out a covert study in which they separated twins and triplets and had them adopted individually as single children. The experiment—said to have been partially funded by the National Institute of Mental Health—came to light in 1980 when three triplet brothers found each other by chance. The triplets had no idea they were related. Someone had deemed it acceptable, in the name of science, to separate twins and triplets from one another for experimentation[39].

Throughout the 1930s and 1940s, the Imperial Japanese Army conducted medical tests on civilians, mostly in China. Although the exact number of deaths is unknown, there are estimates suggesting that many people may have died in these experiments[40].

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[37] https://www.nobelprize.org/prizes/economic-sciences/2001/akerlof/article/

[38] https://www.simplypsychology.org/zimbardo.html

[39] Segal L. Nancy, The Controversial Study of Twins and Triplets Adopted and Reared Apart, October 26, 2021.

[40] McCurry Justin, Unit 731: Japan discloses details of notorious chemical warfare division, The Guardian, 17 April, 2018.

The Boundaries of the Garden

Most of the time, because we are preoccupied with ourselves, we rarely consider that the garden might impose limits on our journey of knowing and understanding. Later, we came to realize that the garden did, in fact, set certain constraints before us—and that, by polluting the garden, we were making these problems even more intractable. Our tendency to overvalue artificial intelligence—which learns from what we write and then explains our own writings back to us—was itself a sign that further limitations awaited us in the future.

In science, especially in classical physics, a deterministic worldview prevailed—one that held that precise measurements and predictable outcomes governed the behavior of all physical systems. Laplace's demon captured this perspective succinctly[41]. However, at the beginning of the 20th century, Quantum mechanics disrupted this classical view, triggering a profound shift in the foundations of physics. A key moment in the transformation of determinism—the idea that complete knowledge of a system guarantees precise prediction of its future behavior—was Werner Heisenberg's discovery of the Uncertainty Principle. Formulated in 1927, it stated that it is impossible to determine both the exact position and momentum of a subatomic particle simultaneously with high precision.

Theoretical physicist Jennifer Rittenhouse explains it this way: "Quantum mechanics only allows us to calculate the probabilities of outcomes. The laws of quantum mechanics are extremely strict and deterministic—until it comes to measurement. If I throw an electron at a wall, all I can say is this: there is a 90 percent chance it will land exactly where I aim, a 5 percent chance it will land in the corner, a 1 percent chance it will end up in a further corner, and so on. In short, Laplace's demon could no longer predict outcomes as it once did in classical physics. The all-knowing demon would no longer know everything—it would have to start rolling dice"[42].

This is why Albert Einstein described quantum entanglement[43] as "spooky action at a distance," and famously remarked, "God does not play dice."

In recent years, significant developments had begun to unfold within the garden. Some within it had greatly advanced a domain built on zeros and ones, insisting that it was inevitable for all of us to follow this path[44]. Some were saying, "Artificial intelligence will not replace humans,

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[41] "We may regard the present state of the universe as the result of its past and the cause of its future. An intellect which, at any given moment, knew all the forces that set nature in motion and all the positions of all the entities composing it—and if this intellect were vast enough to submit these data to analysis—could condense into a single formula the motions of the greatest bodies in the universe and those of the lightest atom. For such an intellect, nothing would be uncertain, and the future, just like the past, would be present before its eyes." — Pierre-Simon Laplace

[42] Spooky Science: Laplace's Demon, October 31, 2023.

[43] When two particles—such as a pair of photons or electrons—become entangled, they remain linked even if there are very large distances between them. https://scienceexchange.caltech.edu/topics/quantum-science-explained/entanglement

[44] Zuboff, Shoshana. *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. Profile Books / PublicAffairs, 2019.

but humans who use artificial intelligence will replace those who do not."[45] Everywhere, it was being written and proclaimed that technology was a necessity[46]. These forces were so powerful that, at one point, they conducted covert psychological tests on 700,000 users; afterward, they apologized, yet this only provoked anger among those who used their machines and among experts.

Once, many scientists had wandered through this garden; they wrote articles and books, and built machines. When we speak of the garden and of science, it would be impossible not to mention Albert Einstein. His friend Kurt Gödel also falls within our scope of interest, as someone who roamed along the boundaries of mathematics. Two other mortals who wandered through this garden were the Knight of Naivety, J. Robert Oppenheimer—who believed he could end war with a massive bomb—and the rather ignoble Knight of Technological Inevitability, Sam Altman.

Mysterious Experiences

In a letter Albert Einstein wrote to a childhood friend in the early 1950s, he said: *"I am in quite good shape, having survived the Nazi period and two wives in triumph."* Apparently, even two marriages were not enough for him, for the famous physicist also added, *"The most beautiful thing we can experience is the mysterious."* Einstein, who also said that "one should do the work one loves and not harm others," described monogamy as "a bitter fruit for all," and spoke of the infidelities that marked both of his marriages. During his emigration to the United States in 1933, there were several women in his life: Margarete, Estella, Toni, and Ethel[47]. According to his biographer Walter Isaacson, *"When confronted with the emotional needs of others, Einstein tended to retreat into the objectivity of his science."* One might imagine that, in retreating into the objectivity of science, he perhaps did not retreat alone…

Einstein's first wife was Mileva Einstein-Maric. The discovery in 1986 of her correspondence with Einstein brought her to public attention. The broader public became aware of her story in the years following the publication of the first volume of *Albert Einstein's Collected Papers* in 1987. The letters had been in the possession of the Einsteins' first son, Hans Albert Einstein, and his family in Berkeley, California.

The extent to which Maric—who had studied physics and mathematics alongside Einstein—contributed to his famous papers that transformed modern physics remains a matter of debate. Considering how often the contributions of women scientists—especially to the work

[45] AI Won't Replace Humans — But Humans With AI Will Replace Humans Without AI, Harvard Business review, August 04, 2023.

[46] Snelson, Jacob,The Necessity of Technology, Digital Society, Aug 4, 2017.

[47] Jha Alok, Letters reveal relative truth of Einstein's family life, The Guardian, July 11, 2006, https://www.theguardian.com/science/2006/jul/11/internationalnews

of prominent male scientists—have been overlooked or even suppressed, the possibility that Einstein's first wife contributed to his papers emerges as a significant one.

The book *"In Albert Einstein's Shadow: The Tragic Life of Mileva Einstein-Maric"*, written by Desanka Trbuhovic-Gjuric, was first published in Serbian in 1969 and later in German and French, but was never translated into English. In her account of Maric's life, the author argued—often without citing sources or providing solid evidence—that Maric was a brilliant mathematician who, if not in physics, surpassed Einstein in mathematics. Moreover, it was claimed that Maric collaborated with Einstein and was an unacknowledged co-author of his famous 1905 relativity paper[48].

Einstein had taken violin lessons at a young age. By his own account, he became truly interested in music at the age of 13, when he encountered the sonatas of Wolfgang Amadeus Mozart. As an adult, wherever he went, a worn violin case accompanied him. Together with the father of quantum theory, Max Planck, Einstein would play sonatas with his violin, Lina—even if it was sometimes slightly out of tune. The great physicist once said that, had he not been a scientist, he would certainly have been a musician. *"A life without music is inconceivable for me. I live my daydreams in music. I see my life in terms of music… I get most joy in life out of music."*

As you may recall, we mentioned at the very beginning of the book how he squandered the money he earned from the Nobel Prize during the Great Depression of 1929. Even if his violin was sometimes out of tune and his investments failed, he was extraordinarily successful in his own field—physics. Like all scientists, Einstein was first a human being, and only then a genius.

The Man Who Reached the Limits of Reasoning

As seen in the photograph, the mathematician and logician Kurt Gödel—who walked with Albert Einstein in the garden on a winter day and remained largely unrecognized outside academic circles—is not widely known. Gödel ventured to the limits of reasoning, speaking of the "incompleteness theorems" and of mathematical statements whose truth could not be determined yet could not be proven. During their time at Princeton University, Gödel and Einstein formed a special bond. The two men were often seen speaking German, walking to and from the Institute, and discussing relativity—including Gödel's rotating universe model—among other topics.

It was again Einstein who nominated Gödel for the prestigious Einstein Award he received in 1951 together with a mathematical physicist. This was a gesture meant to lift Gödel's spirits during a period when he was ill.

[48] Esterson Allen, Cassidy C. David, Does Einstein's First Wife Deserve Some Credit for Her Work? This is the Wrong Question to Ask, Time, March 14, 2019.

Before Gödel, mathematics had been assumed to be “complete,” meaning that every mathematical statement could either be proven or refuted. At the age of 25, Gödel constructed a statement whose truth could not be determined and showed that it was unprovable, thereby demonstrating that mathematics has limits. This result also implied that there are inherent limitations in computer science. If mathematics—the foundation of science—has limits, then science itself must also have limits.

“In recent times, we have grown so accustomed to the seemingly unstoppable progress in computing and artificial intelligence that we often forget their absolute limits. The two limits I wish to briefly discuss today are Gödel's incompleteness theorems and Halting problem. The Halting Problem is a fundamental issue in computer science and mathematics. It asks whether there exists a general algorithm that can determine, for any given program and its input, whether that program will eventually halt or continue to run indefinitely. Alan Turing proved that no such general algorithm can exist, thereby demonstrating a fundamental limit of computation[49]. His proof of the undecidability of the Halting Problem was groundbreaking because it showed that there are intrinsic limits to what algorithms can compute or solve.”

We had limits, yet we wandered through the garden as if we had none.

[49] Danielyan Edgar Ter, Gödel and Turing on absolute limits of computation, LinkedIn, March 24, 2024.

Gödel was born in 1906 in Brünn, in the Moravia region of the Habsburg Empire, into a wealthy family. He enjoyed a comfortable life with servants and governesses, and had a happy childhood. From the age of four, he was known as "Mr. Why." Throughout his life, Gödel lingered at the shores of the question "Why?" From an early age, he was someone who questioned authority and insisted on understanding reasons. He was a sensitive, introverted, intelligent, and curious child. At the age of eight, after reading a medical book, he began to believe that his heart was weak—following a bout of rheumatic fever he had recovered from at age six—and his concerns about his health led to an emotional instability that would last throughout his life. Perhaps such emotional fragilities were something that hovered around many great scientists.

In 1924, the family moved to Vienna, where Gödel decided that physics was "logically too complex" and instead pursued mathematics. He befriended Einstein and attended meetings of the Vienna Circle, a group composed mostly of philosophers. At these gatherings, they discussed, among other things, Tractatus Logico-Philosophicus, the only book by Ludwig Wittgenstein. Although he moved among Jewish intellectual circles and was once nearly beaten for being mistaken as Jewish, Gödel himself was not Jewish.

At the age of 21, Gödel met Adele Nimbursky, who worked as a dancer in a Vienna nightclub. Because Adele was married and six years older than him, Gödel's family disapproved of the relationship. She called him "the boy with the brace." Kurt and Adele were only able to marry in the autumn of 1938[50].

When the Cretan Epimenides said, "All Cretans are liars," it implied that his own statement must also be false, leading to a paradox. At the age of 25, Gödel formulated his "Incompleteness Theorems." His results showed that in any consistent axiomatic mathematical system, there exist propositions that are true but cannot be proven or disproven within the system, and that the consistency of the axioms themselves cannot be proven.

In 1947, Gödel left Vienna and fled to the United States with Adele in order to become an American citizen. While preparing for the citizenship exam, Mr. Why discovered what he believed to be "certain internal contradictions" in the U.S. Constitution that could, in principle, allow someone to legally establish a dictatorship. When Gödel applied for naturalization in 1948, Einstein accompanied him—along with Oskar Morgenstern—to his interview with the Immigration and Naturalization Service.

Oskar Morgenstern later recounted the interview Gödel had in Trenton in 1948:

"Gödel told me quite excitedly that, while examining the Constitution, he had found certain internal contradictions and that he could demonstrate how it might be possible, in a perfectly legal way, for a dictatorship to arise in America. I told him that even if he were right, the probability of such events occurring was very low.

[50] https://www.ias.edu/kurt-g%C3%B6del-life-work-and-legacy

But he persisted, and we had many discussions about this particular point. I tried to convince him not to bring up such matters during the examination before the court in Trenton, and I also mentioned it to Einstein. He was horrified that such an idea had occurred to Gödel and likewise told him he should not speak about it.

Months passed, and finally the day of the examination in Trenton arrived. I picked Gödel up in my car. While driving, Einstein turned slightly and said: 'Now, Gödel, have you really prepared well for this examination?' Of course, this remark upset Gödel greatly—which was precisely Einstein's intention—and seeing the anxiety on Gödel's face amused him greatly.

When we arrived in Trenton, we were taken into a large room. Normally, witnesses are questioned separately from the applicant, but an exception was made because Einstein was present, and the three of us were invited to sit together. The examiner first asked Einstein, then me, whether we believed Gödel would make a good citizen. We assured him that this was certainly the case—that he was an outstanding man."[51]

During his citizenship interview, Gödel had the following exchange with the judge[52]:

Judge: Well, Mr. Gödel, where do you come from?
Gödel: From Austria.
Judge: Tell me, what kind of government did Austria have?
Gödel: It was a republic, but the constitution was such that it eventually turned into a dictatorship.
Judge: Oh, that is terrible! But in the United States, that could never happen.
Gödel: It can—I can prove it.

Fortunately, the judge—distracted by Einstein and Morgenstern—did not pursue the matter and granted him U.S. citizenship. One cannot help but wonder how valuable it would have been if George Orwell—who was born three years earlier and died in 1950—had met Gödel while writing *1984*.

After suffering severe bleeding due to an ulcer, Gödel began following a strict diet that led to significant weight loss. Later, fearing poisoning, he would only eat food that Adele had tasted first. After Adele's death, Gödel refused to eat and died in 1978.

The Knight of Naivety: J. Robert Oppenheimer

Kurt Gödel was born in 1906 in Moravia, while Oppenheimer—two years earlier, in 1904—was born in New York into a wealthy family. Both grew up in privileged environments with governesses. Oppenheimer enjoyed a Manhattan apartment adorned with paintings by Pablo

[51] https://www.ias.edu/kurt-g%C3%B6del-and-institute#:~:text=G%C3%B6del%20and%20Einstein%20formed%20a,universe%20model%2C%20among%20other%20topics.
[52] https://www.ias.edu/kurt-g%C3%B6del-and-institute#:~:text=G%C3%B6del%20and%20Einstein%20formed%20a,universe%20model%2C%20among%20other%20topics.

Picasso, Rembrandt, Vincent van Gogh, Paul Cézanne and other great artists, in a setting where his parents "treated him like a jewel."[53] He grew up in Manhattan and, by working on the Manhattan Project, became a central figure in one of the most important scientific developments in history. For Hideki Yukawa, Japan's first Nobel laureate, Oppenheimer was "a symbol of the tragedy of the modern scientist."[54] He would also become one of the most prominent victims of the right wing's relentless hatred during the McCarthyism witch hunts.

His father, Julius Oppenheimer, was a German immigrant working in textile imports; his mother, Ella Friedman, was a painter from a family long established in New York. As a child, Oppenheimer had very few friends—his mother rarely let him go outside for fear he might fall ill. Later, he would say, *"My childhood did not prepare me for the fact that the world is full of cruel and bitter things."* It would not be wrong to say that he passed much of his childhood and youth as a kind of hypochondriac.

The Oppenheimer family did not belong to any synagogue. Without rejecting their Jewish identity, they chose to live it within the Ethical Culture Society, a uniquely American branch of Judaism aligned with rationalism and secular humanism. The motto of its school was, "Deed, not Creed." Founded in 1876, the Ethical Culture Society instilled in its members a sense of responsibility, social action, and commitment to humanism. This was also an innovative approach for immigrants to America, and for Oppenheimer it led to a lifelong ambivalence about his Jewish identity[55].

Ambition, insecurity, intelligence, naivety, determination, fears, and resilience—all these traits coexisted within Oppenheimer's character. To his friends, he was an almost incomprehensible bundle of contradictions. As for politics, he was distant enough to ask, *"Tell me, what does politics have to do with truth, goodness, or beauty?"* Yet he was surrounded by relatives, friends, and colleagues who were members of the Communist Party. This closeness would later draw the attention—and wrath—of McCarthyite investigators. Although not a party member, he donated significant sums to causes supported by the left, including the Spanish Civil War. These associations would eventually lead to FBI reports being written about him.

While working on the Manhattan Project, after listening to Leo Szilard warn about the deadly consequences of the atomic bomb, Oppenheimer reportedly said, *"This is nonsense."* When Szilard asked what he meant, Oppenheimer replied: *"It's a weapon with no military significance. It will create a big explosion—a very big explosion—but it's not a weapon that will be useful in war."*

A weapon with no military significance… one that would create a massive explosion but be useless in war.

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[53] https://www.nps.gov/articles/000/the-life-of-j-robert-oppenheimer-life-before-the-manhattan-project.htm

[54] Henson Shaun, Christopher Nolan's Oppenheimer (2023): A Film Review, 23 August 2023.

[55] Bird Kai, Sherwin J. Martin, American Prometheus: The Triumph and Tragedy of J. Robert Oppenheimer, Alfred A. Knopf, 2005.

This is where naivety begins. As his friend Isidor Isaac Rabi put it, *"He was extraordinarily wise, and yet very foolish."* Foolish enough to believe that the atomic bomb would not become a usable weapon of war. And yet, when that same friend later suggested working together on the bomb, Oppenheimer said he did not wish to turn "the culmination of three centuries of physics" into a weapon of mass destruction.

He balanced his fragile and delicate nature with stubbornness, pride, and endurance. At a summer camp, other boys once took him to the camp's icehouse at night, stripped and beat him, painted his genitals green, and locked him inside. Robert was subjected to outright torture—yet he neither reported the incident nor left the camp.

These were the days when research in quantum physics was ongoing, but the subject still retained an air of uncertainty within scientific circles. Albert Einstein remarked, *"Heisenberg has laid a great quantum egg. In Göttingen they believe him, but I do not."* Meanwhile, Oppenheimer was battling what a close friend described as a first-rate depression—with the help of psychiatrists—while also immersing himself in philosophy, politics, art, and especially French literature. His only weapon against depression was walking. The French poet Charles Baudelaire was among his favorites, and he particularly loved reading poems such as *Recueillement* ("Meditation").

Meditation (*Recueillement*)

Be quiet, O my Sorrow, and be more discreet.
You called for Evening; it descends; it's here:
A dusky air surrounds the town,
Bringing peace to some, to others care.

While the vile multitude of mortals,
Under the whip of Pleasure, that merciless executioner,
Goes to gather remorse in servile festivals,
My Sorrow, give me your hand; come this way,

Far from them. See the dead Years leaning,
In outdated clothes, on the balconies of the sky;
Regret, smiling, emerges from the depths of the waters;

The dying Sun falls asleep beneath an arch,
And, like a long shroud trailing toward the East,
Listen, my dear, listen to the soft Night walking.

In the autumn of 1925, Robert Oppenheimer was working nights in Cambridge, sleeping during the day, and coughing a lot due to his heavy smoking. At one point, while working in the laboratory, his emotional state deteriorated significantly. Robert admired his stern-faced professor, Blackett, in the lab and was constantly seeking his approval. However, Blackett, an applied experimental physicist, wanted Robert to work more on areas where he was lacking.

When this became a source of anxiety for Oppenheimer, he both sought help from a psychiatrist to alleviate his troubles and, in a very foolish move, poisoned an apple with laboratory chemicals and left it on Blackett's desk. Fortunately, his father saved him from the troubles that such an attempt could have caused.

During the war, while trying to develop the atomic bomb as part of the Manhattan Project, Robert believed that only an atomic bomb could drive Hitler out of Europe, and he worked toward this goal. The most important thing for him was that the bomb be built before the Nazis could make one. He knew that the Germans were also pursuing the bomb and would say, "Now we are all sons of bitches."

Finally, they detonated the bomb. The explosion produced such a brilliant white flash that one of the physicists thought something had gone terribly wrong, imagining that they had set the world ablaze, and while looking at the resulting mushroom-shaped cloud, he realized that the world could never remain the same. Oppenheimer, on the other hand, felt like the destroyer of worlds, a bringer of death, as in an Indian epic, and began to contemplate the blood now on his hands.

In early 1944, Oppenheimer convinced George Kistiakowsky, an explosives expert from Harvard, to work at Los Alamos. Oppenheimer and Kistiakowsky made a bet about whether the bomb would detonate successfully. If the bomb went off without issues, Kistiakowsky would receive ten dollars; if it failed, Kistiakowsky would pay Oppenheimer a salary. When the bomb detonated, Kistiakowsky fell to the ground from the force of the blast and requested his ten dollars from Oppenheimer. Shortly afterward, a ceremony was held at Los Alamos to present a signed ten-dollar bill, and Oppenheimer gave Kistiakowsky his winnings.

Everything had now changed. Although the wake-up call came slightly late, Oppenheimer remarked, "At the end of the summer of 1945, the bomb was detonated over the cities of Hiroshima and Nagasaki. The scale of the loss of life and the total destruction of the cities served as a wake-up call for physicists regarding the potential of the atomic bomb."[56]

It is worth noting that this seemingly trivial bet over ten dollars had enormous consequences for life and cost. In his memoirs, Truman mentions that he spoke to Stalin about the devastating power of their weapons but that Stalin showed no particular interest. Oppenheimer had now become famous in America, and the media suggested that he be celebrated. This was a magnificent achievement, and the physicists had accomplished work so significant that they could metaphorically be given a Superman suit.

Yet none of this brought Oppenheimer happiness. He seemed unable to understand why he had done it, and his confusion was evident in his words and behavior. President Truman, too, had grown weary of his contradictions. After Oppenheimer told the President that the blood

[56] Urbina Fabio, Lentzos Filippa, Invernizzi Cédric, Ekins Sean, AI in Drug Discovery: A Wake-up Call, 2022, https://www.sciencedirect.com/science/article/pii/S1359644622004032

was on their hands and allowed him to be concerned, Truman referred to him as “a weeping scientist” and said, “I don’t ever want to see that son of a bitch in this office again.”

Thinking of Prometheus stealing fire and giving it to humanity, and Zeus ordering Hephaestus to chain Prometheus to the Caucasus Mountains where he was bound for years, attacked daily by an eagle, with his liver growing back each night to be eaten again, it’s impossible not to recall Oppenheimer’s—and humanity’s—suffering. In the end, these events fell upon the confused scientist Oppenheimer, who, despite his scientific achievements, was accused of treason and passed from this world as a Knight of Purity, Robert Oppenheimer.

It was painful, but once again, science had been served up as an appetizer for humanity’s wars.

Sam Altman, the Limping Knight of Technological Inevitability

Ah, Sam. Slow down a bit, will you? You went from running an incubator to this, raking in money, and now comparing yourself to Robert Oppenheimer. Maybe a pause is in order. Naturally, someone might ask, “Incubator? Sure—but how much did he make from Y Combinator?”[57] Fair question. And just as you critique the Oppenheimer movie for not being a role model for kids, they might ask you if you’ve become one yourself.

I won’t pry into your marriage, your Hawaiian honeymoon, your wife saying you “love cows,” or your adoption plans. Let’s stick to what really matters: your connection to artificial intelligence, your reign as CEO of OpenAI, because that seems to touch everyone on the planet.

I won’t ask if your favorite sibling is Annie. By six, Annie had already toyed with the idea of suicide, even if she didn’t know the word. She often introduced herself in elevators and grocery stores: “I’m Annie Francis Altman, what’s your name?” And I’ll spare you the November 2021 tweet that Big Tech conveniently swept under the rug. Enough said.

You see yourself as smart, though not a genius, brimming with confidence that misleads even you at times, demanding we understand the arc of technology and society across long horizons. Some even whisper that you view yourself as superhuman. You are a vegetarian. You declare: “The big secret is that you can shape the world to your will with an astonishingly high probability; most people won’t even try,” blaming ordinary mortals for not thinking big enough. Creativity? Mere remixing of the past, you say.

Sam Altman grew up in the St. Louis suburbs as the eldest of four—three boys, one girl—in a middle-class Jewish household. Love and faith were repeated daily by his parents, almost as if on a script. His brother Jack likened it to an extra flap in your heart—a metaphor that would leave most brains spinning.

[57] Y Combinator is a finance company that provides startups with small amounts of seed funding.

Sam, what's truly valuable to you? The mezuzah[58] your grandfather carried in his pocket all his life and left to you when he died? Religious artifacts? A touch of spirituality in the mix—I won't pretend to understand. Ordinary humans may never grasp the complexity you embody.

For years, you've drawn parallels with Oppenheimer, bragging to journalists about sharing the same birthday. Or is it your investments in nuclear energy that trigger the comparison? And remember your poll on X: people were asked whether they preferred Oppenheimer or Barbie. Oppenheimer got 82%—yet you chose Barbie. You even disliked the Oppenheimer film.

Here's the kicker: comparing yourself to Robert Oppenheimer is a mistake. The man, despite tragic consequences, was a scientist, naive but well-intentioned. You, however, are a CEO. Compare yourself to Steve Jobs, a fellow college dropout. Remember what Jobs said: "Deciding what not to do is as important as deciding what to do." Perhaps you've pondered this wisdom in the context of AI, realizing it's not always a clean story.

The "Open" in OpenAI must grate even on Elon Musk now that you cozy up with Microsoft, yet you seem unfazed. Since taking the helm, you've steadily diluted your own company. Wasn't this supposed to be non-profit? Weren't the model codes meant to be open for scrutiny and improvement?

In Munich, after unveiling GPT-5, you asked the crowd whether they wanted AI code released openly. The audience shouted yes. Your response: "Wow, we definitely won't do that, but interesting to know." If you won't do it, why call it OpenAI? This is like your call for a global "AI Agency," knowing full well it would be hard to implement. A little misdirection, perhaps. Ah Sam, you may not realize it, but this is a garden of systematic errors, and we all wander here for a while. Even the $100 billion Microsoft–OpenAI data center, should it materialize, will eventually fade in significance[59].

You know full well AI will make humans weaker, more biased, less rational, less capable, and ultimately less valuable. Ask you, and you'll deny it—but your words convince the masses anyway. And behind you, Big Tech's media machinery hums along.

Your "Wisdom 2.0" conference—probably because you graduated from Wisdom 1.0—featured Silicon Valley's beloved Buddhist Jack Kornfield. Draped in white, hands folded, not crossing your legs, you meditated. Kornfield called you a servant-leader with a pure heart. No talk of transhumanism, no questions about what happens to our electronic ghosts in computers.

You proclaimed, with the zeal of a true believer:

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[58] Mezuzah is a small case that some Jews place on the right doorpost of their home, containing texts from the Torah. In Hebrew, mezuzah literally means "doorpost," but in a narrower sense, a mezuzah refers to the parchment placed inside a case made of wood, metal, or a similar material, which is affixed to the doorpost. — Wikipedia

[59] Reuters, March 29, 2024.

“This technological revolution is unstoppable. The future could be almost unimaginably wonderful. We will add a fourth great technological revolution—AI—to agriculture, industry, and computing. Managed responsibly, it will generate enough wealth to meet everyone’s needs. Capitalism is a powerful engine, rewarding those who invest in value creation; but progress comes at a cost: inequality. Some inequalities are normal.”

An unstoppable, inevitable technological revolution…

AI seems written in our fate…

Why inevitable? Couldn’t we do something else? Feed the hungry through a second agricultural revolution?

No.

We are compelled. This revolution *will* happen. It will create immense wealth. Inequalities? Don’t worry—they’re normal. This, Sam Altman, is the Sam Altman way.

Don’t ever think that technology is constantly increasing the inequalities labeled as “normal,” because they don’t want you to think about it.

Context windows are important in artificial intelligence because there is a relationship between the size of the context window and how much information AI models can remember during a session. The context window is the amount of text the model can take as input while reading or writing. It is thought that in a year or two, AI models could have short-term memories, or context windows, roughly equivalent to 10 books totaling 1,440 pages. It’s truly astonishing, and Eric Schmidt explained in a video what can be done with technology at this level in just a couple of years: “You tell the AI to write the code, work with its users to make a TikTok, and make it go viral on social media within an hour—and it does.”[60] It’s almost unbelievable.

I suppose there is a possibility that, in the future, most people could be born unemployed and retired. To study the impact of the technological revolution on people, Altman conducted an experiment on universal basic income[61], giving people in Texas and Illinois $1,000 a month and observing how they spent it. He contributed $14 million of his own money, and OpenAI added $10 million. The total cost of the study was $60 million. The trial began in 2020, lasted three years, and involved roughly 3,000 people. There was also a control group receiving $50 per month[62]. Whether or not he will take on this responsibility in the future aside, Big Tech had

[60] Ex-Google CEO's BANNED Interview | Eric Schmidt, https://www.youtube.com/watch?v=WOLrv-ypfXc

[61] Universal basic income is a government program concept in which every adult citizen regularly receives a set amount of money. See: https://www.investopedia.com/terms/b/basic-income.asp

[62] Streitfeld David, Is It Silicon Valley’s Job to Make Guaranteed Income A Reality? The New York Times, July 16, 2024.

essentially signed off on a study as if providing guaranteed income to those they make unemployed was their own responsibility.

Some interpreted the results of this study as if it were something completely new: “Giving low-income people $1,000 unconditionally may cause them to work slightly less, giving them more free time.”

According to the study:

- Recipients primarily spent the $1,000 on basic needs such as food, housing, and transportation, increasing their monthly spending by an average of $310.
- The money was also used as financial support for others, with an average of $22 more per month spent in this way.
- Compared with the control group, recipients worked an average of 1.3 hours less per week.
- Participants were 26% more likely to visit a hospital and 10% more likely to receive dental care or go to the emergency room.
- They were 4.4 percentage points more likely to move out of their neighborhoods.

In our view, the study revealed how inadequate and poor the U.S. healthcare system is, and how difficult the conditions are for low-income people regarding food and housing. The authors noted, “Although we did not find a significant effect on physical health measures, the increased use of medical care may lead to long-term health benefits.” Even though participants went to the hospital and dentist slightly more, this $1,000 essentially did not improve physical health. The fact that recipients worked on average 1.3 hours less per week suggests that simply giving people money does not make it easy to keep them at home without work.

In 2023, Altman embarked on a world tour across 22 countries and 25 cities. The trip, which started to introduce users to the ChatGPT AI model, became a sort of high-society presentation party. Diane von Furstenberg introduced you as “one of my newest, very close friends.” According to her, meeting Sam was a bit like meeting Einstein. Mostly dressed in a suit, and sometimes with your gray heels, you presented yourself to diplomats as the “inevitable” new superpower of technology.

You met with UK Prime Minister Rishi Sunak, French President Emmanuel Macron, Spanish Prime Minister Pedro Sánchez, German Chancellor Olaf Scholz, Indian Prime Minister Narendra Modi, South Korean President Yoon Suk-yeol, and Israeli President Isaac Herzog, and took a photo with European Commission President Ursula von der Leyen.

Now, regarding his statements about responsibility and how much we can trust AI under someone like him: In May 2020, your sister Annie Altman moved to a farm in Hawaii. Shortly after moving, she received an email from Sam asking for her address. Sam wanted to send her a memorial diamond made from their father’s ashes. According to Annie, sending a diamond

made from their father's ashes to a mailbox on one of these rural farms full of open mailboxes was heavy, upsetting, and angering—but at the same time very funny and absurd. In her view, their father never wanted to become a diamond.

In November 2021, Annie Altman spoke about being Sam's "first client" in the sex work field and requested financial help from Sam and their mother, which they refused[63]. She also claimed on Twitter that she had suffered sexual, physical, emotional, verbal, and financial abuse mostly from Sam Altman, and sometimes from Jack Altman, her biological siblings[64]. Yet mainstream media didn't report a single story about her claims. The Altman family said, "We love Annie and, like any family, we will continue to do our best to support and protect her."

Sam Altman had offered to buy Annie a house, but she did not want to be controlled. She said she had been making a living over the past three years by working as a sex worker "both in person and online." Annie also tried to connect people with money to those in need via Instagram.

Meanwhile, Elon Musk's transgender daughter Vivian Jenna Wilson revealed in her first interview that, as a child, she was subjected to cruelty and lack of support because she was feminine and gay[65]. Musk rarely supported her, scolded her, harassed her for feminine traits, pressured her to appear more masculine, and made her deepen her voice starting in elementary school.

Why mention these issues? Discussions about AI constantly stress "safe AI," yet no one talks about how safe the people at the very top of AI actually are. We brought up these matters to remind readers, not because it concerns us what people do with their sexual preferences.

In 2023, Sam Altman wore a tuxedo and later attended a White House dinner with Oliver Mulherin, who would become his spouse. We certainly had systematic errors. Kurt Gödel spoke to us about the limits of mathematics, yet people paid little attention. Robert Oppenheimer, a scientist who openly revealed the dilemmas of science, largely engaged us through media and film. In fact, Sam Altman should have conducted a poll on X asking whether people preferred Sam Altman or Barbie—and we fear Barbie would have won.

As for which is more dangerous, Sam never asked that question…

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[63] Sam Altman's sister, Annie Altman, claims Sam has severely abused her, lesswrong, 8 October, 2023, https://www.lesswrong.com/posts/QDczBduZorG4dxZiW/sam-altman-s-sister-annie-altman-claims-sam-has-severely

[64] https://x.com/anniealtman108/status/1459696444802142213

[65] Ingram David, Elon Musk's transgender daughter, in first interview, says he berated her for being queer as a child, NBC, July 26, 2024.

ASCETIC MONKS

Nietzsche describes a perspective he calls the "ascetic ideal."[66] Among the ascetic monks who give meaning to human suffering, there are also figures such as scientists and philosophers. They love thinking and believe that intellectual ideas are more advanced than the emotional and bodily sensations they consider primitive. According to Nietzsche, hermit monks inflict suffering on people because, by possessing natural bodily and emotional urges, they make humans feel guilty and advocate for restricting encounters with everything that makes life enjoyable—love, sex, friendship, achievement, and wealth. In this sense, scientists are like the same ascetic monks: in their libraries and laboratories, they undergo a form of self-imposed hardship, promoting guilt in others and advocating restrictions on life's pleasures.

According to this view, they also dictate to society what it should do. James Chadwick, the 1935 Physics Nobel laureate and author of the 1941 British government report on the inevitability of the atomic bomb, which eventually set the Manhattan Project in motion, said: *"I remember the spring of 1941. It was then that I realized that a nuclear bomb was not only possible but inevitable. These ideas could not be unique to us. Very soon, everyone would be thinking about them, and some countries would implement them… And afterward, I had to start taking sleeping pills. It was the only solution, and I have never stopped since."*[67]

The atomic bomb wasn't enough; a hydrogen bomb was invented afterward. *"The transition from the Bomb to the Super (hydrogen bombs) was unquestionably just as significant. In the Tokyo air raids, hundreds of bombers dropped thousands of tons of conventional explosives on the city. Later that year, Little Boy fell on Hiroshima, releasing similar destructive power in a single bomb. But only seven years later, Teller's hydrogen bomb multiplied and achieved a thousandfold increase in yield; it was a single bomb with more explosive power than all the bombs dropped throughout World War II combined."*[68]

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[66] For the ascetic monk, ascetic ideals are the only way to defend and assert himself. He suffers, weakens, and becomes deprived by conforming himself to these ideals. Suffering is his only pleasure. He takes delight in inflicting pain on himself and in annihilating himself through this pain.
"Nietzsche explains in detail how the perspective he calls the 'ascetic ideal' in the Judeo-Christian tradition drives humans toward nihilism. According to him, the resentful person with a slave morality tends to seek the cause of his own unhappiness and suffering in another. In the logic of slave morality, the method for determining the distinction between 'no' and 'evil' is to designate as 'evil' that which is seen as the enemy, and to say 'no' to oneself in relation to being opposed to the enemy. Therefore, Nietzsche describes such a person as reactive and full of resentment. The priest, as the advocate of the ascetic ideal, gives meaning to the suffering of the resentful person; by saying 'you suffer because you are paying the price for your sins,' he directs the slave-morality person's resentment inward. As the term 'ascetic' implies, according to the ascetic ideal, the way for a person to pay the price for being guilty and sinful is by suppressing the impulses and emotions inherent to this world; the individual must withdraw from this world, guided by the fantasy of the other world."
Raptis Buket Korkut, *Nietzsche'nin Bakışından Varoluşçuluk, Kaygı*, 19(I1)/2020, p. 506.

[67] https://todayinsci.com/C/Chadwick_James/ChadwickJames-Quotations.htm

[68] Aschenbrenner Leopold, Situational Awareness, 6 Haziran 2024, s.46, https://situational-awareness.ai/wp-content/uploads/2024/06/situationalawareness.pdf

Politicians and bureaucrats, in hiding nuclear war plans, even played tricks on the President, adding subtle designs that could lead to human suffering and catastrophic outcomes. For the sake of their ascetic ideals, politicians and bureaucrats didn't even show the nuclear war plans to the President.

Daniel Ellsberg[69] recounts that in the spring of 1961, President Kennedy's National Security Advisor, McGeorge Bundy, asked the Chairman of the Joint Chiefs of Staff to send a copy of the highly secret *Joint Strategic Capabilities Plan* (the U.S. nuclear war plan) to the White House. The Joint Chiefs' chairman told Bundy, "We cannot do this." Although Bundy argued that the U.S. President wanted to read it, they could not agree. Eventually, Bundy and Defense Secretary Robert McNamara decided to be briefed on the plan at the Pentagon. However, what these senior officials representing the President were shown was not the plan itself, but only a briefing. Shortly after, when Ellsberg saw the actual plan, he compared it to what had been shown to Kennedy's representatives and realized that all of them had underestimated the destruction that would result from implementing the real nuclear war plan[70].

Moving to recent times, let's read what one of the extreme scientists wrote about how he felt. On June 6, 2024, former OpenAI employee Leopold Aschenbrenner published an essay dedicated to Ilya Sutskever, who had left OpenAI, called *"Situational Awareness"*[71]:

"Soon the world will wake up. But right now, there are maybe a few hundred people in San Francisco and AI labs with situational awareness. By some strange powers of fate, I found myself among them. A few years ago, these people were mocked as crazy, but they trusted the trend they were following, which allowed them to accurately predict AI advances over the past few years. Whether they are right or wrong will be shown in the next few years. But these are really smart people, the smartest I have met, and they are the ones developing this technology. Perhaps they will become a strange footnote in history, perhaps they will enter history like Szilard, Oppenheimer, and Teller. If they see the future correctly, we are embarking on a crazy journey."[72]

Soon the world will wake up…
It didn't in the past, and we didn't think it would now…
As Fernando Pessoa wrote in *The Book of Disquiet*:

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[69] Daniel Ellsberg (April 7, 1931 – June 16, 2023) was an American political activist, economist, and U.S. military analyst. While working at the RAND Corporation, he accelerated a national political debate in 1971 when he published the Pentagon Papers—a highly classified Pentagon study on the U.S. government's decision-making processes regarding the Vietnam War—in *The New York Times* and *The Washington Post*. https://en.wikipedia.org/wiki/Daniel_Ellsberg

[70] Perkovich George, 'The Doomsday Machine': Daniel Ellsberg's Riveting Memoir Flags the Risks of a Nuclear Winter, February 8, 2018.

[71] https://www.youtube.com/watch?v=WLJJsIy1x44

[72] Aschenbrenner Leopold, Situational Awareness, 6 Haziran 2024, https://situational-awareness.ai/wp-content/uploads/2024/06/situationalawareness.pdf

"The back of this man is asleep too.
Walking ahead of me at the same pace,
this person has fallen asleep with his whole being.
He walks unconsciously.
He sleeps because we all sleep.
Life is entirely a dream.
He lives unconsciously.
As the unfed children of Fate,
we sleep through life.
That is why, when I think with this feeling,
toward childish humanity, toward the social life asleep,
toward all of us and everything,
an endless, shapeless love awakens within me."

The strange powers of fate…
Szilard, Oppenheimer, and Teller…
We were embarking on a crazy journey.
I don't think the world will wake up anytime soon; these people remain footnotes on the edge of history, from before and after World War II…
In short, humanity made the atomic bomb and now seems poised to make an even bigger mistake.
"An AI model is just a big CSV file on a server. It can be stolen. To match trillions of dollars, your smartest intellects, and decades of work, an adversary needs to do only one thing: steal this file. (Imagine the Nazis having obtained a complete copy of every atomic bomb made at Los Alamos.)"[73]

An online magazine reported: *"In a new interview, a former OpenAI employee made a striking claim about his former employer's plans for human-level AI, or more specifically, how to make huge profits from it. Former OpenAI security researcher Leopold Aschenbrenner claimed that he had heard from 'multiple people' that his former employer had planned to launch a global human-level AI bidding war in previous years. Aschenbrenner said, 'At one point a few years ago, OpenAI leadership prepared a plan to finance and sell human-level AI by starting a bidding war between the U.S., Chinese, and Russian governments.'"*[74]

We don't know if this is true or false, but a profit-driven company might well do this, so we set it aside. However, we do know that OpenAI, which has achieved dazzling successes in AI, isn't entirely innocent. Initially, its terms of service and usage policies prohibited any activity with high physical-risk, including military use and weapon development. What happened to that ban? It was lifted in January 2024.

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[73] Aschenbrenner Leopold, Situational Awareness, 6 Haziran 2024, s.93, https://situational-awareness.ai/wp-content/uploads/2024/06/situationalawareness.pdf
[74] https://futurism.com/.../former-openai-employee-agi....

In one conversation, Geoffrey Hinton, called the godfather of AI in the West, was asked:

- Does humanity know what it is doing?
- No.

Humans continue to act without knowing what they are doing, and as observers, we are left to watch what they do and see where it starts and where it leads. On June 13, 2024, OpenAI appointed retired U.S. Army General Paul M. Nakasone to its board with a security focus. Nakasone had worked at the NSA, the U.S.'s largest intelligence-gathering agency, from 2018–2023. Edward Snowden, who has lived in Russia since 2013 after leaking NSA documents, said about this appointment: *"This is a deliberate and calculated betrayal of the rights of every person in the world."*[75]

To summarize, could these scientists, who will become strange footnotes in history, also be Nietzsche's ascetic monks? How can we explain conscious scientists, politicians, and bureaucrats performing such actions? The simplest answer may be that even people at the very highest levels often do things without really knowing what they are doing.

OUR GREATEST FOOLISHNESSES, OUR MOST CLEVER DEEDS

Perhaps we should have met in your lucid dreams, where one of your dreams would tell me, "we are asleep, our lives are a dream, but sometimes we wake up enough to know we are dreaming." I imagine you speaking and writing in your lucid dreams during the moments when you are awake enough to recognize that we dream, Mr. Wittgenstein. When I read you saying, "Man must wake up to be curious; perhaps people do it this way. Science is a way to send him back to sleep," I started thinking I had to write this book as soon as possible.

When you said, "We are not aware of what we calculate and process with words," could you have already been describing large language models, Mr. Wittgenstein, long before they existed? I also borrowed the title of my story from you: *Our Greatest Foolishnesses, Our Most Clever Deeds.* Since you lived in a house filled with material and cultural wealth, this might not bother you. What exists is indebted to what does not.

And then you say, "If people never did foolish things, nothing clever would ever be done." I suppose it's safe for me to think that those who perform very clever deeds are usually scientists. While I had in mind writing something about how their cleverest actions can turn into the greatest foolishnesses, you suddenly appear before me. You may call me a plagiarist, but the more I explore your writings and sayings, the more I realize that your ideas would contribute most to the book I am beginning to imagine.

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[75] Roytburg Eva, Edward Snowden eviscerates OpenAI's decision to put a former NSA director on its board: 'This is a willful, calculated betrayal of the rights of every person on earth', Fortune, June 14, 2024.

Moreover, you uttered the phrase, “Our greatest foolishnesses, our most clever deeds,” long before humanity faced the greatest errors like the atomic bomb or even AI, before scientists had delved into these matters. In this sentence, I must say there is a touch of the *Sisyphus Myth*. If even our cleverest actions can turn into our greatest foolishnesses, how can I not be pessimistic, Mr. Wittgenstein? Your insights are incredible; frankly, your language and the whistling you borrowed inspired me to write this book.

While language games flourish all around us, you should have lived in the era of large language models. You would meet Mr. Noam Chomsky and debate whether these models are mere stochastic parrots. Strange, isn’t it? These models complete their training on the Internet and then assume the role of giving advice to humans. Perhaps this is precisely where science has found a way to send us back to sleep with these models, all of which are plagiarists. AI is driving everyone crazy these days. Look, even *The New York Times*, which sued because its articles were allegedly used to train AI, secretly experiments with AI as an editor. Eventually, *The New York Times* may abandon the Democrats and support the Unemployed Editors’ Guild.

I recall the sci-fi film *Arrival*. After the alien ships arrive on Earth, linguists struggle to crack the alien language, especially the circular symbolic writing. Even though it’s a film, analysis doesn’t get far—and you would be proven right. Meaning requires a life-world as reference. Your phrase, which I adopted as the title of my book, made me reflect deeply on the nature of meaning, Mr. Wittgenstein.

Claude Lévi-Strauss said, “It seems that writing has served more for exploitation than for humanity’s enlightenment.” If this is true, then is it not extremely problematic that AI would learn from writing “that has served exploitation rather than the enlightenment of humanity”? As you can see, my mind is very confused about these recent developments, Mr. Wittgenstein.

I asked these models what relevance they could have to your thoughts. They told me: “Large language models have the potential to concretize the concept of language games and demonstrate the contextuality of meaning. However, it should not be forgotten that they do not fully reflect all aspects of language and that further research in this area is needed.” It may seem absurd to you, but I even asked Gemini what foods you like. The response from Mr. Ludwig Josef Johann Wittgenstein was:

“I do not have sufficient information about this person to assist with your request. I am a large language model and can communicate; I can generate written responses to a wide range of commands and questions, but my knowledge about this person is limited. Is there anything else I can help with regarding this request?”

Truly shameful. It has limited knowledge about you…

You say, “Large language models have the potential to concretize the concept of language games and demonstrate the contextuality of meaning,” and then claim you don’t know the person… Truly shameful[76].

I know you worked on the philosophy of language, and some describe you as the most important thinker of the 20th century and one of the greatest and most influential thinkers of your time. To you, language shared the logical form of reality more than reflecting reality itself. Therefore, a proposition expresses not reality itself but an image—it is a logical picture of reality.

In some respects, you are a poet as well. You studied aeronautical engineering and wanted to become an engineer. At the Upper Atmosphere Research Station, you flew experimental kites and worked on propeller designs. I truly don’t understand how you moved from experimental kites to the contextuality of meaning, Mr. Ludwig Wittgenstein. While dealing with experimental kites, you were also reading Bertrand Russell’s *The Principles of Mathematics*, taking notes along the way.

How did you begin to think, within the framework of language games, about whether an apple in a sentence refers to a fruit or a computer brand, Mr. Wittgenstein? I am tempted to use your full name because it reminds me of Ludwig van Beethoven, but your name is indeed quite long. In 1889, in Vienna—where Beethoven had written his Ninth Symphony 65 years earlier—you were born into a large family and grew up with your siblings in the Palais Wittgenstein, almost like a palace.

You were the youngest child of the family, surrounded by wealth and culture; your home was filled with paintings and sculptures. We see your sister Margaret in a painting by Gustav Klimt as she marries. Your grandfather on your father’s side was a wealthy Jew, while your father was a steel industrialist and one of the richest men in Austria. Curiously, three of your father’s five sons committed suicide due to psychological struggles. When Wittgenstein was only thirteen, one of his brothers died by suicide; two years later, another brother, Rudi, did the same, shaking the family once again. Much later, in 1918, his eldest surviving brother, Kurt Konrad, also took his life at the age of forty. The suicides of three brothers, along with a depressive atmosphere inherited from the family, clearly suggest Wittgenstein’s own inclination toward suicidal thoughts.

Throughout his life, Wittgenstein frequently grappled with the idea of suicide and discussed it with close friends, especially Bertrand Russell. Russell admitted that these thoughts disturbed him. Wittgenstein may have ultimately resisted them through the belief that suicide was a fundamental sin.

Wealth and culture were defining features of your home—it was almost like a cultural salon. Your mother, Leopoldine Wittgenstein, the daughter of a banker connected to the upper class,

[76] https://thedecisionlab.com/thinkers/philosophy/ludwig-wittgenstein

was a Catholic. Although your paternal side was Jewish, she raised you in that faith. It is surprising, but somehow Judaism seems to have "lost the match" in your household. The word "dominant" comes to mind when thinking of your mother, Mr. Wittgenstein. As the daughter of a banker, she strongly encouraged the family's cultural and musical life.

For you and your family, constantly quoting Arthur Schopenhauer—"Music is an expression of the inner nature of the world"—culture was above all a culture of music. To you, music was not only a symbol of culture but also the most advanced of all the arts. You were also deeply interested in Western films, German Romantic poetry, gardening, and even an American detective magazine.

One day, you and your brother Paul wanted to join a gymnastics club in Vienna. No matter how wealthy you were, like many clubs at the time, it did not admit Jews. To gain entry, you agreed to lie and say you were not Jewish, but your brother Paul refused.

I do not know whether you ever heard your mother shout "Don't interfere in my business!" at your father, but I truly think a famous film director should make a movie about your household. Upon your mother's invitation, Johannes Brahms and Gustav Mahler were regular visitors, and with her encouragement, your brother Paul became a concert pianist. How many times did you have tea with Brahms and Mahler, Mr. Wittgenstein? Maurice Ravel and Richard Strauss—surely also among your visitors—were among those who wrote concertos for your brother Paul, who lost his arm in the 1914 war, so that he could play with one hand.

Concertos written especially for your brother, playable with a single hand…

I have read how much you loved Brahms, yet disliked Mahler's music, saying, "Mahler becomes unbearable for me," and even remarking, "Modern music sometimes becomes filth." In your personal notes, Brahms is often mentioned alongside Beethoven, Mendelssohn, Wagner, and Bruckner. For you, Brahms's music was close to the romantic conservatism of Mendelssohn. Your home must truly have been extraordinary—if I could travel back in time and visit, I might encounter Brahms, Mahler, Ravel, or Strauss. I would have liked to tell Brahms that, years later, a film titled *Do You Like Brahms?* would be made. He might have asked me, "What is a film?"

I know that Gustav Mahler was born in a village. His father was a successful entrepreneur, and his mother Marie bore fourteen children. His father's harshness and authority toward his mother left negative marks on young Gustav's life. Perhaps while you were growing up, and Mahler was composing his Fifth Symphony, he was visiting your home. During the days when his wife was unfaithful with a young architect and he sought brief therapy from Sigmund Freud—who diagnosed him with the Oedipus complex—he may also have visited you. Let me ask you, Mr. Wittgenstein: could your mother have influenced Mahler, who was Jewish, to become Catholic, or did Mahler choose that path simply to become conductor of the Court Opera? Did you ever tell him, "Nothing is harder than not deceiving oneself"? Even after converting, the press continued to attack him anyway…

Do not be modest, Mr. Wittgenstein—you were said to have an exceptional musical sensitivity. In adulthood, you even taught yourself to play the clarinet, and your most striking musical ability was reportedly to whistle entire compositions from memory. I can almost hear your whistled version of Beethoven's Ninth Symphony.

At someone's suggestion, you went to the University of Cambridge to meet Russell. Russell, sipping tea, initially mistook you for a madman when you suddenly appeared unannounced, later describing you as "an unknown German… who spoke very little English but refused to speak German."[77] Over time, however, Russell came to see you as a genius. He once described you as "the most perfect example I have ever known of a traditionally conceived, passionate, profound, intense, and dominant genius."[78]

It is almost unbelievable—you seem not to have known a single ordinary, unknown person. In the 1910s, with the invitation of the famous economist John Maynard Keynes and Russell's support, you joined the Apostles, a secret discussion society at Cambridge. Who wasn't there? Bertrand Russell, G. E. Moore, even Soviet spies. Around the same time, you became Russell's student at Cambridge, engaging in discussions on logic and philosophy. You were so wealthy that when you missed a train from Manchester to Liverpool, you immediately tried to hire a private train.

Missed the train…

No matter, we'll just hire a private one…

What a life you lived, Mr. Wittgenstein. I am not jealous—only trying to understand. This brilliance seems to have dimmed later. You lived a rather turbulent life. Before the war, you were meticulous about your ties; during the war, you served as a mechanic in an artillery workshop, later trained as an officer in Olmütz, where you met Paul Engelmann and became interested in religion. In early 1918, you were assigned to a mountain artillery regiment on the southern front in Tyrol, captured by the Italians, and held prisoner near Monte Cassino until the end of 1919.

The war changed you profoundly. You abandoned your concern for fine ties, and at just thirty, after your father's death, you gave away your vast inheritance to your siblings and others, choosing to live in poverty. Were you tired of money? I wonder if there is another philosopher who chose to become penniless despite such wealth. Perhaps your father's death affected you deeply.

After the war, you decided to abandon philosophy and live as a primary school teacher in a remote Austrian village. Yet you were too refined to fit into small-town life. Moreover, you physically punished students, which was not well received. After an incident involving a child,

[77] https://www.handprint.com/SC/WIT/witt04.html
[78] https://thedecisionlab.com/thinkers/philosophy/ludwig-wittgenstein

you were brought to court and eventually left teaching. Later, you briefly worked as a gardener in a monastery near Vienna. Then came designing your sister's house in Vienna, managing its construction, and eventually returning to philosophy. Even your family's doctors were famous—Sigmund Freud treated your nephew.

You could well say: "Brahms and Mahler often visited us. Ravel and Strauss wrote concertos so my brother could play. Freud treated my nephew. And when I missed a train, I tried to hire a private one."

You had romantic relationships with both men and women. In the summer of 1912, Russell introduced you to David Pinsent, and you quickly became close friends. You conducted experiments in a psychology laboratory on the role of rhythm in musical appreciation and presented a paper on the subject at the British Psychological Society in Cambridge in 1912. That same year, you traveled with Pinsent to Iceland and later to Norway. In May 1912, Pinsent wrote that you had only just begun studying the history of philosophy and that "it was an unprecedented surprise for him to discover that all the philosophers he had once ignorantly worshipped were, in the end, fools and charlatans making disgusting mistakes."[79] In truth, this is a problem for all of us—later in life, many people wonder how they once tolerated the flaws of philosophers they had revered in ignorance.

Perhaps out of a bit of envy, I suddenly feel like writing "Wanted" across your photograph. I do not know whether you ever imagined that language—the place of thoughts and reality, like an ancient city where language games are played—would become so central to artificial intelligence. I think of you throwing away your expensive ties after the war and whistling Beethoven's Ninth Symphony from beginning to end.

And I have one last question: when Gustav Mahler told your mother that he had received impromptu therapy from Sigmund Freud, were you there as well?

When you first read Sigmund Freud, you were deeply impressed, noting that at last a psychologist had said something meaningful about the interpretation of dreams. You, too, often interpreted your dreams in your diaries. Even if you did not consider them to be the fulfillment of imaginary wishes or to carry sexual meanings, they seem to have held personal significance for you. In a letter to your sister, you describe how you could not get a passage from Felix Mendelssohn out of your mind and offer a psychoanalytic interpretation of it.

As for whether an interpretation of your platonic marriage appears in those notes—since life itself is entirely a dream, I would rather listen to your whistling, Mr. Ludwig Wittgenstein. A platonic marriage? But after all, you did say, "Nothing is harder than not deceiving oneself." I do not know whether you also meant, in this context, the famous line, "Whereof one cannot

[79] Ludwig Wittgenstein: I've Had a Wonderful Life, OshoNews, November 8, 2016.

speak, thereof one must be silent." I truly wonder what kind of image would have formed in your mind as I say these things to you, Mr. Wittgenstein.

In fact, Freud might have left Mahler aside and given you some impromptu therapy as well—but it seems you did not benefit from such encounters. Believe me, I have no intention of offending you, yet I cannot help but wonder whether your "dominant" mother had any role in this matter of your platonic marriage—I find myself wanting to ask your family doctor, Freud.

There were typewriters around, yet it seems you wrote your articles and books by hand. I doubt you felt much affinity for machines. Still, I would like to tell you about a story written by Roald Dahl in 1954, three years after your death: *The Great Automatic Grammatizator*. In it, there is an electrical engineer named John Bohlen and a young assistant called Knipe:

"The construction of the great automatic computing engine commissioned by the government some time ago is now complete. It is probably the fastest electronic calculating machine in the world today. Its function is to meet the ever-increasing demand of science, industry, and administration for rapid mathematical calculations—calculations which, by traditional methods, would either be physically impossible or would take far more time than could be justified…"

In short, the work begins as an automatic calculating machine, but young Knipe soon transforms it into something that would surely interest you as well:

"Then suddenly he was confronted with a powerful but simple little fact: that English grammar is governed by rules that are almost mathematical!"

Do you think the author of that line—"English grammar is governed by rules that are almost mathematical!"—might have read your work, Mr. Wittgenstein? If Roald Dahl could see today how words are represented as numerical vectors in computers and processed by large language models, he would surely be astonished—even if he had imagined something similar. Given your deep interest in the relationship between language and mathematics, I suspect you would not be surprised at all.

Let us continue the story:

"Given the words and the meaning of what is to be said, there is only one correct order in which these words can be arranged. No—that is not entirely true. In most sentences there are various alternative positions for words and phrases, all of which may be grammatically correct. But what of it? The theory itself is fundamentally sound. Therefore, it is logical that a machine built along the lines of an electronic computer could be adjusted to arrange words—instead of numbers—into the correct order according to grammatical rules. Give it verbs, nouns, adjectives, pronouns; store them in the memory as a vocabulary and retrieve them when needed. Then feed it the plot and let it write the sentences."

If we were to say that Dahl, as early as 1954, foresaw what would happen in the 2020s—sixty-four years later—we would not be entirely wrong.

Knipe, who had always wanted to be a writer, now stood on the brink of that possibility. Soon he became unstoppable, producing five-thousand-word stories in thirty seconds:

“You see, because I have an adjustable coordinator between the ‘plot memory’ section and the ‘word memory’ section in my machine, I can produce any kind of story I desire simply by pressing the appropriate button.”

Bohlen and Knipe eventually turn this into a business. They begin selling stories and novels generated by the machine on almost any subject, earning vast sums of money. Writers who once dismissed them as mad soon become eager to make deals. At the end of the story, one writer says of the proposed agreement:

“At this very moment, as I sit here listening to my nine children crying from hunger in the next room, I can feel my own hand moving closer and closer to that golden contract lying on the table.”

Dahl imagined that money would be made by selling machine-generated stories to writers—but here he was slightly mistaken. Today, and even more so in the future, the machine itself may earn more than the writers.

Ah, if only syntax had evolved into forms that could tell us truth and falsehood… Humans can still convey or understand any thought through basic syntax. In many political regimes and social exchanges, false meanings continue to spread. “Basic syntax—even in modern times—continues systematically to translate falsehood.”

In the *Tractatus Logico-Philosophicus*, you said, “Death is not an event in life: we do not live to experience death.” Like you, I find myself saying, “I do not know why we are here, but I am quite sure it is not in order to enjoy ourselves.” It was fashionable then to emphasize the horrors of war; today, equally terrible things happen around us, yet we seem blind to them—perhaps because we are preoccupied with artificial intelligence.

If only we could see.

Perhaps all that remains for us is to whistle.

Would you whistle for me, Mr. Wittgenstein—let it be the Ninth Symphony…

FAILING TO UNDERSTAND WHILE TRYING TO UNDERSTAND

If you want to grasp what the depth of science is like—or rather, to fail to grasp it out of fear of the concepts of topology—you should read this text. Science is in fact intertwined with qualities and ambitions that can exist in all human beings: reason, madness, ambition, curiosity, overreaching, melancholy, the desire for fame. Perhaps some scientists who possess these traits can behave in ways quite different from what we call ordinary people.

“Being able to prove—or not being able to prove”—has always been the central problem of all great mathematicians. The loneliness of mathematicians may arise from working in an abstract

world, but also from the cultural weight of their discipline. Most of the problems posed to mathematicians require transformation before they even become mathematically meaningful. This reality creates disappointment and suspicion about the profession of mathematics among those working in engineering, economics, medicine, linguistics, and similar fields; this, in turn, becomes another source of the mathematician's isolation[80].

Andrew Wiles, who proved *Fermat's Last Theorem* after seven years of solitary work, describes it as follows:

"Perhaps my most important encounter with mathematics during my school days was finding 'Fermat's Last Theorem' in a mathematics book. As a ten-year-old child, I was captivated by the magic of this three-hundred-year-old problem. The question on the cover was clear: Can you prove that for non-zero rational numbers, when n is an integer greater than or equal to three, the equation has no solution?

$$x^n + y^n = z^n$$

Fermat had claimed, in the margin of a copy of a book by the classical Greek mathematician Diophantus, that he had found a truly marvelous proof of this theorem, but that the margin was too small to contain it."[81]

Fortunately, this eight-year isolation did not have a negative impact on Sir Andrew Wiles's mental health.

Two Japanese mathematicians, Yutaka Taniyama and Goro Shimura, adopted a completely different approach to Fermat's Last Theorem. They formulated a conjecture in another branch—seemingly unrelated—within number theory: algebraic geometry, and more specifically, elliptic curves. The proof of the Taniyama–Shimura conjecture implied the truth of Fermat's statement. Wiles spent eight years in complete isolation, trying to prevent anyone from discovering what he was working on, until he reached the result. In 1993, he presented his work in a carefully prepared series of lectures at Cambridge University's Isaac Newton Institute[82].

In 1958, Taniyama began working as an assistant at the University of Tokyo, became engaged, and received a job offer from the Institute for Advanced Study in Princeton, New Jersey. On November 17, 1958, Taniyama died by suicide, leaving a note apologizing to his colleagues for the trouble he caused. The opening paragraph read:

"I had no definite intention of killing myself until yesterday. However, more than a few people must have noticed that I have recently been physically and mentally exhausted. As for the cause of my suicide, I myself do not fully understand it. It is not the result of any specific event

[80] https://www.brown.edu/Research/Istrail_Lab/CCMB/events_solomon_marcus.htm
[81] https://www.shawprize.org/autobiography/andrew-john-wiles/
[82] https://www.bbvaopenmind.com/en/science/mathematics/from-the-margins-to-glory-the-story-of-andrew-wiles/

or particular matter. I can only say that I am in a state of mind in which I have lost confidence in my future…"[83]

About a month later, Misako Suzuki, the woman Taniyama had planned to marry, also died by suicide from carbon monoxide poisoning, leaving behind the note:

"Wherever we go, we promised each other. He has gone; I must go to join him."[84]

Mathematicians such as Alan Turing, Andreas Floer, Aleksandr Lyapunov, Felix Hausdorff, Arthur Black, Yutaka Taniyama, and C. P. Ramanujam, all struggled with depression and died by suicide. Kurt Gödel, who feared being poisoned and had his wife taste his food, could also be said to have died in this way—after his wife fell ill, he refused to eat[85].

The *Lonely Runner Conjecture* seems almost designed to describe the solitude of mathematicians: "Imagine n runners on a circular track of unit length. At time t = 0, all runners start from the same position. Their speeds are constant, distinct, and may be negative. A runner is said to be 'lonely' at time t if they are at least 1/n distance away from all others along the circle. The conjecture states that, regardless of the choice of speeds, each runner will be lonely at some point."[86]

Grigori Perelman, born in 1966 and now in his late fifties, is perhaps an ideal example to illustrate how scientists can differ from ordinary people. Perelman is a figure out of step with our times: indifferent to money, uninterested in praise, devoted purely to the pursuit of knowledge. He ignored prestigious journals that reject papers and then celebrate Nobel Prizes while profiting from scientists' work.

While working in the United States, he wore the same brown corduroy jacket, lived on black bread, milk, and cheese, and reportedly did not cut his hair or nails, saying, "If they are growing, why shouldn't we let them grow?"[87] Today, he lives a reclusive, almost mysterious life with his mother in his hometown of Saint Petersburg, having even withdrawn from mathematics.

To better understand Perelman, we must say a little about what occupied his mind. But please, do not stop reading by saying, "What is all this?" We only wish to give a glimpse of what he pondered for years. Perelman once expressed a view like this: "If they know what I have done, they do not need my CV; if they do not, then I do not need to work there."

You have probably not thought much about what a "conjecture" means in mathematics. A conjecture is a statement that appears to be true but has not been formally proven. In 1904, the French mathematician Henri Poincaré formulated such a conjecture in topology—the study of properties of shapes that remain unchanged under continuous deformations like

[83] https://en.m.wikipedia.org/wiki/Yutaka_Taniyama
[84] https://en.m.wikipedia.org/wiki/Yutaka_Taniyama
[85] https://www.usatoday.com/story/tech/2015/03/08/mathematician-deaths/24605901/
[86] https://en.m.wikipedia.org/wiki/Lonely_runner_conjecture
[87] Nasar Sylvia Gruber David, Manifold Destiny, The New Yorker, 1 Mart, 2007, p.38.

stretching and bending—and it remained unproven for nearly a century. It is as if Poincaré had said to scientists: “Stop being so proud. I will write such a conjecture that you will not be able to prove it for a hundred years.”

Higher-dimensional analogues of the *Poincaré conjecture* were proven by Stephen Smale in dimensions greater than four (1960) and by Michael Freedman in four dimensions (1982), both earning them the Fields Medal. However, whether what holds in two dimensions also holds in three remained uncertain for many years[88].

Do not underestimate topology—physicists study the shape of the universe through it. The Poincaré Conjecture, a century-old enigma concerning the properties of three-dimensional spheres, is regarded by mathematicians as a kind of holy grail, both because of its deep implications for mathematics and cosmology and because it resisted all attempts at solution for so long[89].

Poincaré used the term “manifold” (a geometric object) to describe these abstract topological spaces. The simplest possible two-dimensional manifold is a sphere. The proof that an object is a sphere lies in its being “simply connected,” meaning that no holes pierce it. If you tie a loop around a sphere, you can slide the loop along the surface and shrink it to a point. By contrast, if you tie a loop through the hole of a torus (a donut shape), you cannot shrink it to a point without tearing the torus[90]. From a topologist’s perspective, there is no difference between a torus and a coffee mug with a handle. Each has a single hole, and one can be continuously deformed into the other without cutting or tearing.

Poincaré proposed that all closed, simply connected three-dimensional manifolds (those without holes and of finite extent) are spheres. This conjecture was potentially important for scientists studying the universe, the largest known three-dimensional manifold[91]. As Marcus du Sautoy from the University of Oxford put it, “This is a central problem in both mathematics and physics because we are trying to understand what shape the universe might have.”[92] The problem became something of an obsession among mathematicians, even earning the nickname “Poincaritis.”[93] Grigori Perelman himself became completely fixated on proving this conjecture, living for years as if it were his sole purpose in life.

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[88] O’Shea Donal, Perfect Rigor: A Genius and the Mathematical Breakthrough of the Century Notices of the AMS Volume 58, Number 1, p.57.

[89] Nasar Sylvia Gruber David, Manifold Destiny, The New Yorker, 1 Mart, 2007, p.34.

[90] Wendorf Marcia, The Mystery of Grigori Perelman, May 18, 2019.

[91] Nasar Sylvia Gruber David, Manifold Destiny, The New Yorker, 1 Mart, 2007, p.36-37.

[92] Randerson James, Meet the cleverest man in the world (who's going to say no to a $1m prize), The Guardian, 16 Aug, 2006.

[93] Ibid.

By 1982, the Poincaré Conjecture had been proven in all dimensions except the third. In 2000, the Clay Mathematics Institute listed it as one of the seven most important problems in mathematics and offered a prize of one million dollars to anyone who could prove it[94].

The person who ultimately solved this conjecture was Perelman, then 44 years old. In 2002–2003, he published his solution on the internet via arXiv, almost as if defying the prestige of major mathematical journals. The correctness of his proof was officially confirmed in 2006. On March 18, 2010, he was awarded the Millennium Prize. However, Perelman declined the Fields Medal in 2006—one of the highest honors in mathematics—saying, "I am not interested in money or fame; I do not want to be exhibited like an animal in a zoo." It remains unclear whether part of his decision also stemmed from the four-year delay in verifying his proof and the objections raised during that period.

Elon Musk praised him. The Russian geometry expert Mikhail Gromov commented, "To do great work, you must have a pure mind. You can think only about mathematics. Everything else is human weakness. Accepting prizes is a sign of weakness."[95]

One of the main reasons Perelman refused the prize was his belief that the solution to the Poincaré Conjecture was a collective achievement. He thought the award should have been shared with the mathematician Richard Hamilton, whose foundational work on Ricci flow played a crucial role in Perelman's proof. Whether others would have expressed this with such honesty is another question.

Without delving too deeply into topological abstractions, we might compare Perelman's solitude to that of Isaac Newton. Shortly before his death, Newton described his life as follows: "I do not know what I may appear to the world, but to myself I seem to have been only like a boy playing on the seashore… whilst the great ocean of truth lay all undiscovered before me."[96]

As the vast ocean of truth stretched before him, Perelman, like a child, occupied himself with pebbles on the shore. Awards, fame, money, and publication in prestigious journals were trivial to him. Words once used for Newton could equally apply to Perelman: "The solitary yet highly creative life of his childhood prepared him for the creative but painful and isolated life he would lead as an adult."[97]

His advisor, Gromov, said of him: "He likes to be alone. His obsession with an idea, his working independently, his indifference to others' opinions remind me of Newton. Newton was harsher. Perelman is gentler, but very obsessive."[98]

How did all this come about?

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[94] Nasar Sylvia Gruber David, Manifold Destiny, The New Yorker, 1 Mart, 2007, p.37.
[95] Ibid., p.43.
[96] Mlodinow Leonard, The Loneliest Genius, Nautilus, November 20, 2014.
[97] Mlodinow Leonard, The Loneliest Genius, Nautilus, November 20, 2014.
[98] Nasar Sylvia Gruber David, Manifold Destiny, The New Yorker, 1 Mart, 2007, p.39.

As a child, like many Jewish children, Perelman learned to play the violin from his mother and a teacher. His father was an electrical engineer, and his mother was a mathematics teacher at a college. Speaking of his father, who later moved to Israel, young Grigori once said, “He gave me logical and other mathematical problems to think about. He gave me many books to read. He taught me how to play chess. He was proud of me.” Among the books his father gave him was a copy of *Physics for Entertainment*, a bestseller in the Soviet Union in the 1930s. As a child, Perelman also read authors such as Jules Verne, H. G. Wells, and Mark Twain[99].

By the age of ten, Perelman had already participated in regional mathematics competitions, demonstrating his talent. He graduated from School No. 239 in Leningrad, one of the most prestigious high schools of its time. Sergei Rukshin, who led the mathematics club Perelman attended, played a decisive role in shaping the young prodigy[100].

At sixteen, in 1982, Perelman entered Leningrad University, where he studied advanced geometry and solved a problem posed by the mathematician Yuri Burago, who later became his doctoral advisor. Burago remarked, “There are many highly talented students who speak before they think. Grisha was different. He thought deeply, and his answers were always correct. He checked his answers very, very carefully. He was not fast. Speed means nothing. Mathematics is not about speed. It is something deep.”[101]

He loved music throughout his life. He was particularly excited to own a recording of the famous 1946 performance of *La Traviata*, in which Licia Albanese performed the role of Violetta[102].

In January 1982, Perelman achieved a perfect score at the International Mathematical Olympiad in Budapest, earning automatic admission to university.

However, in a Russia heading toward economic collapse, even being talented was not enough for a Jewish student. The Steklov Institute of Mathematics had not accepted any Jewish students until Perelman. Yet Aleksandr Danilovic, who held significant prestige, wrote a letter to the director requesting that Perelman be allowed to pursue graduate studies under his supervision at the Leningrad branch of the Steklov Institute. This is how Perelman was able to enter the institute. His advisor was the mathematician Yuri Burago, a professor at Leningrad State University, who spoke with Mikhail Gromov—then working at an institute outside Paris—and suggested that his extraordinary student spend several months working with him in Paris. Perelman’s first major joint paper with Burago and Gromov was written in 1992 in this way.

Thanks to Gromov, Perelman was invited to the United States to speak at the 1991 Geometry Festival at Duke University, where he lectured. At that time, the Russian economy had

[99] Ibid., p.37.
[100] O’Shea Donal, Perfect Rigor: A Genius and the Mathematical Breakthrough of the Century Notices of the AMS Volume 58, Number 1, s.57.
[101] Nasar Sylvia Gruber David, Manifold Destiny, The New Yorker, 1 Mart, 2007, p.37.
[102] Ibid., p. 37.

collapsed, and mathematicians at the Steklov Institute had fallen into poverty. In 1992, Perelman was invited to spend the fall semester as a postdoctoral fellow at New York University and the spring semester of 1993 at the State University of New York. While he was in the United States in 1992, his mother stayed with friends in New York; his father had already emigrated to Israel, and his younger sister Lena was still studying in St. Petersburg.

While attending lectures at the Institute for Advanced Study in the United States, Perelman went to a talk by Richard Hamilton on Ricci flow and spoke with him afterward. He was impressed by Hamilton's openness and generosity when he shared ideas he would publish only years later—something most mathematicians would not do. Feeling that he did not know much, Perelman asked him questions.

Hamilton, the son of a doctor from Cincinnati, was very different from Perelman and did not resemble the stereotypical "nerdy" mathematician. He rode horses, went windsurfing, and had a series of girlfriends. He saw mathematics as only one of life's pleasures. Yet apart from a groundbreaking series of papers on Ricci flow, he had published relatively little and had very few graduate students. Perelman had read Hamilton's papers and, somewhat shyly, approached him after attending his talk at the Institute[103].

Later, while Perelman was a Miller Fellow at Berkeley, he attended some of Hamilton's lectures and began to understand why Hamilton had not made further progress in proving the Poincaré Conjecture using Ricci flow. Around that time, he received offers to work as a professor at Stanford, Princeton, and Tel Aviv University. After his Miller Fellowship ended in the summer of 1993, he returned to the St. Petersburg branch of the Steklov Institute and lived mainly on savings from the money he had earned in the United States.

In 1996, he refused to accept the prize of the European Mathematical Society. When Perelman read a paper Hamilton published in 1995, he realized that Hamilton had made no decisive progress on the Poincaré Conjecture. The following year, he wrote to Hamilton proposing collaboration. When he received no reply, he decided to solve the problem on his own. "What set Perelman apart was not only his flawless use of Ricci flow, but also his deep understanding of the fabric of geometric structures, allowing him to methodically break the problem into parts."[104]

On March 18, 2010, he was awarded the Millennium Prize. In July 2010, Perelman refused to accept the one million dollars, stating: "I do not like their decisions; I consider them unfair. I believe that the contribution of the American mathematician Hamilton to the solution of the problem is no less than mine." In fact, he had wanted to work with Hamilton, but when Hamilton arrived late to a talk Perelman gave in the United States and asked no questions

[103] Nasar Sylvia Gruber David, Manifold Destiny, The New Yorker, 1 Mart, 2007, p.38.
[104] Youvan Douglas C., Mathematicians in Solitude: The Intersection of Brilliance and Isolation, April 6, 2024.

during the long discussion session or afterward at lunch, Perelman concluded, “I had the impression he had only read the first part of my paper,” and decided to proceed alone[105].

Hamilton, whom he had wished to collaborate with, later said: “I also showed how similar surgeries[106] in three dimensions could complete the proof of the three-dimensional Poincaré Conjecture, and I explained to Grigory Perelman the importance of avoiding collapse. Perelman accomplished this in a series of brilliant papers in 2003, using a very clever non-collapsing result derived from a new Li–Yau type estimate for the conjugate heat equation.”[107]

Perelman was truly humble. He began with the mindset: “If I make a mistake and someone else uses my work to construct a correct proof, I would be pleased. I never set out to be the one who alone solved Poincaré.”

Starting in November 2002, over a period of eight months, Perelman published his proof of the Poincaré Conjecture in three installments on the internet. To him, perhaps, like a sonnet or an aria, a mathematical proof had its own unique form and a set of rules.

Sylvia Nasar and David Gruber described him as follows:

“We arranged to meet the next morning at ten on Nevsky Prospekt. From there, Perelman—wearing a casual jacket and loafers—took us on a four-hour walking tour of the city, commenting on every building and view. Later, we all went together to a five-hour vocal competition at the St. Petersburg Conservatory. Perelman repeatedly said that he had retired from the mathematical community and no longer considered himself a professional mathematician. He spoke of a disagreement years earlier with a collaborator about how to trust the author of a particular proof, and said he was horrified by the lax ethics of the discipline. ‘Those considered outsiders are not the ones who violate ethical standards,’ he said.”[108]

According to them, Grigori Perelman was indeed a recluse. The previous December, he had resigned from his position as a researcher at the Steklov Institute in St. Petersburg and had very few friends. He lived with his mother in an apartment on the outskirts of the city. Although he had never given an interview before, he was candid and open when Nasar and Gruber visited him in late June, shortly after Yau’s conference in Beijing, and he took them on a long walking tour of the city. “I am looking for a few friends, and they do not have to be mathematicians,”[109] he said.

A week before the conference, Perelman had spent hours discussing the Poincaré Conjecture with Sir John M. Ball, then president of the International Mathematical Union, at an unusual

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[105] Nasar Sylvia Gruber David, Manifold Destiny, The New Yorker, 1 Mart, 2007, p.41.
[106] In mathematics, particularly in geometric topology, surgery theory is a collection of techniques introduced by John Milnor for producing one finite-dimensional manifold from another in a “controlled” manner.
[107] Autobiography of Richard S. Hamilton, https://www.shawprize.org/autobiography/richard-s-hamilton/
[108] Nasar Sylvia Gruber David, Manifold Destiny, The New Yorker, 1 Mart, 2007, p.43.
[109] Ibid., p.34.

meeting held in a grand mansion overlooking the Neva River. At the end of May, a committee of nine leading mathematicians had voted to award Perelman the Fields Medal for his work, and Ball had traveled to St. Petersburg to persuade him to accept the prize at the Union's public ceremony.

William Paul Thurston, a pioneer of low-dimensional topology who received the Fields Medal in 1982, said of Perelman: "In modern society, most of us relentlessly and reflexively pursue wealth, consumer goods, and admiration. We have learned from Perelman's mathematics. Perhaps we should pause, reflect on ourselves, and learn from his attitude toward life."

Masha Gessen[110], who wrote a book on the subject, argues that those around Perelman protected him from ordinary reality, inadvertently allowing him to believe that the world was as it ought to be. We believe this detailed account is largely speculative. In her book, Gessen persistently diagnoses Perelman with Asperger's syndrome without presenting concrete evidence of what he actually believed[111].

He was strange, perhaps—but it seems he succeeded in mathematics in doing what he sought in life: to grasp all the possibilities of nature at once and eliminate everything that lay outside that domain[112].

SILVER INGOTS IN A BABY STROLLER

Dig, dig, dig…

All these years you broke German codes and saved lives, yet now you cannot break the code you created for the silver you buried yourself. You have filled the forest with pits—but to no avail.

Somewhere else, a German ship is sinking because of a code you cracked. You are not even aware that you may have shortened the war.

How many times have you dug here, thinking you solved the code?

Now dig your own grave.

Who was it that, fearing what might happen if the Germans won the war, turned everything he owned into silver and buried it in this forest?

Didn't you also create a code for the silver you buried? And now you cannot solve your own code.

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[110] Gessen Masha, Perfect Rigor: A Genius and the Mathematical Breakthrough of the Century, Houghton Mifflin Harcourt, 2009.
[111] O'Shea Donal, Perfect Rigor: A Genius and the Mathematical Breakthrough of the Century Notices of the AMS Volume 58, Number 1, s.58.
[112] Ibid., p. 58.

The grass, the moss, the forest—and that dog watching you—if anyone saw where you buried the silver, it was them. Stop stammering now, focus on your task. Dawn will soon break in the forest of Bletchley Park.

Dig—in the darkness of the night and of the code you cannot solve.

If the Nazis come, you would need that silver… If they come—or will they? You would know, after all—you are the genius.

For someone who managed to chain a teacup to a radiator using a coded lock, what is this task? You could simply devise another code. You had thought of it on one of those days when you rode your bicycle to work wearing a gas mask issued by the government during hay fever season. For someone who used a string instead of a belt and wore a pajama top under an overcoat, why should this be difficult?

Remember…

You are 14 years old, about to start at Sherborne School in Dorset. Your first day coincided with the General Strike of 1926. You were so determined not to miss it that you cycled 97 kilometers from your home in Southampton. Later, when you learned how to find the square root of a number, you figured out how to calculate cube roots and astonished those around you.

Your troublesome English and Latin teacher kept shouting, “As democracy advances, manners and morals decline.” He once caught you solving algebra problems during a period reserved for religious instruction and was so furious that he failed you in both subjects.

At 18, your close school friend Christopher died suddenly of tuberculosis. You loved him deeply. When you learned of his death, it felt as though everything around you collapsed with a deafening noise. You did not even hear your friends saying, “Life goes on, but…”

It is absurd, but you simply cannot solve the code you created. Forget Enigma—crack this one, go on, find your silver. You used to talk on the phone with your mother about a children’s play on the BBC about Larry the Lamb. One day, while drinking tea, she asked you what encryption meant. You immediately wrote out the alphabet and showed her how the word “patika” could be encoded as “tdymod” using a Caesar cipher with a three-letter shift. “Who would ever use that?” she asked. Then she answered herself: “Spies, I suppose,” and dropped the subject.

Dig, dig, dig…

The grass, the moss, the forest—and that dog watching you…

They must have fallen asleep too; not a sound, not a breath remains.

How many times have you come back, how many times have you dug here—yet all in vain.

You do not have your own decoded messages to help you break the code you created for the place where you hid the silver.

When you went to America in 1936, you saw that they trusted machines more than people. You trusted yourself, encoded the location of the silver in case the Germans won the war—but now you cannot find it.

Dig, dig, dig…

Ah, this is not the first foolish thing you have done. You have a talent for ruining your own life. Who was it that proposed marriage to that girl, got engaged, and then confessed he was homosexual?

What use is the test that distinguishes a human from a computer now? First, break the code that reveals where you hid your silver.

Dig, dig, dig…

From inside the pit, your young friend Christopher seems to be looking at you, as if saying, "Wake me when September ends." In another corner of the pit lies a bitten, bright red apple and a small bottle of potassium cyanide. In a broken, worn-out baby carriage: silver ingots—and a lost lamb.

All of this is in vain. Entirely in vain.

Somewhere, a German ship sinks into the depths of the ocean; codes are being broken. And what use is it now that you work on a mathematical model capable of explaining the development of certain biological forms or structures?

In case of a German occupation, you thought bank accounts would be useless, so you bought a quantity of silver ingots, placed them in an old baby carriage, and buried them in the forest at three in the morning—keeping only a rough map of where they lay.

If only you hadn't buried them…

A rough map, you say—now break the code you wrote yourself and find your silver.

You did everything you could. You even came back here with your friend Donald, turning the place upside down with a metal detector.

Still, you couldn't find them. You still couldn't.

Dig, dig, dig…
The grass, the moss, the forest—and that dog watching you…

They must have fallen asleep too; there is not a sound, not a breath.

Inside the old baby carriage: a lost lamb, lost silver—and at the bottom of the pit, an apple laced with potassium cyanide. Christopher looks into your eyes as if to say, "Wake me when September ends." Your eyes are dazzled by the gleam of the silver ingots. In the old baby carriage, a lost lamb.

And now—who will decipher the code of that stopped watch tied to your waist?

150 THOUSAND SHORT SPAGHETTI

No matter how much biology I tried to learn, the strange narrative book I was writing simply refused to pick up speed. The city square had turned into a gigantic concrete dragon, spewing hellfire from its mouth, multiplying and circulating dreams of desiccation and burning in our minds as if copying them over and over again. Not quite knowing why I was there, I finally managed to flee from the middle of the square and take refuge in the shade at its edge. For now, I supposed, I would not be scorched out of existence.

As I searched for my destination on my phone's navigation, an extremely old map suddenly appeared on the screen. In the relative coolness of the shade, I examined it carefully: I saw part of Bulgaria's Black Sea coastline, some regions of European Russia to the east, a large stretch of Anatolia's Black Sea coast to the south, and a vast portion of the Black Sea itself. The map was very old and had nothing whatsoever to do with where I was going. When I asked who had made it, I received the answer: Muhammad al-Idrisi.

Frankly, I had no idea who he was. As I began to research, I learned that he had been born in 1100 in Ceuta, a border city between Spain and Morocco in North Africa; that he had spent much of his early life traveling across North Africa and al-Andalus; that he had visited Anatolia at the age of sixteen; and that he had studied at the university in Córdoba.

At the age of fifty-four, al-Idrisi had spent eighteen years at the court of the Norman King of Sicily, Roger II of Sicily. For Roger, he created the map I had partially seen—engraved onto a massive solid silver disk two meters in diameter, known as the *Tabula Rogeriana*. Not all sources agreed: some said he had stayed at the court for fifteen years, others claimed the diameter of the silver map was 3.5 meters. Still others even wrote that it was not circular but rectangular. Among the earliest world maps, it was one whose name no longer appeared in search engines today. Muhammad al-Idrisi had also written that in the 7th century, when the Arabs succeeded in conquering Sicily, they brought with them an Arab dish called "itriyya," which he described as "dry pasta."

It was the first time I was learning that pasta might be an Arab dish, and I found myself in a state of astonishment at the Italians' skill in marketing it as their own. Life truly was strange under this infernal heat—I had moved from one of the earliest world maps to pasta, which had nothing to do with either the map or the extraordinary temperature.

My mind was thoroughly confused. As I stood in the shade trying to decide what to do, I found myself, almost at random, running into a spaghetti restaurant at the corner of the square. The moment I felt the cool air of the air conditioners, I regained some composure and realized I was hungry. What crossed my mind was *Spaghetti Puttanesca*, an Italian dish said to have been passed down through medieval Neapolitan prostitutes. I was in the right place; with a plate of spaghetti, I could silence the stories of old maps—like that silver table in my mind—provoked by my hunger and my uncertainty.

Since the waiters were busy arguing among themselves about a national match and showed little inclination to attend to me, I had to shout, “Waiter!” The youngest among them, clearly urged forward by the others, came to my table somewhat reluctantly, as if he did not want to miss the conversation. I almost asked him whether he knew spaghetti was an Arab dish, but his weary expression prevented me.

“Spaghetti,” I said. “One plate of spaghetti. With parmesan on top. And a bottle of water.”

He turned, hurried back to the corner, disappeared briefly toward the kitchen while still listening to the others’ commentary, and returned within a minute to his place. After a while, he brought a plate of pasta and a bottle of water, set them down, and as he turned to leave, he almost whispered, “Enjoy your meal.”

It was just as well that I had not mentioned Muhammad al-Idrisi or *itriyya*.

The coolness of the place quickly brought my hunger back into sharp focus. Twirling the fork, I began wrapping the spaghetti around it, cutting the strands to a manageable length with my knife so as not to spill the sauce. Suddenly, for no apparent reason, I imagined the spaghetti on the plate as snakes intertwined with one another. I set my fork down and stopped eating. This time, I began to see them as tangled cables. I compared them to thin rubber bands, to worms in rotting fruit—but it never occurred to me that there might be things in my brain resembling spaghetti. Eventually, that thought came too.

In 2019, Christof Koch, President and Chief Scientist of the Allen Institute for Brain Science, was asked how close we were to understanding our own brain. His answer was: “We still don’t even understand the brain of a worm.” The laboratory worm known as *Caenorhabditis elegans* had 302 neurons and 7,000 connections between them. The human brain, by contrast, contained approximately 100 billion neurons intertwined with around 100 trillion connections, or synapses.

Every human effort rested on the brain. Everything in art, science, literature, the humanities, and politics was about the brain. And because we did not understand the brain, we did not understand anything. Alongside the many things we could not measure, we nevertheless possessed enormous amounts of data about it. In recent years, researchers had painstakingly mapped and described all these connections, yet they still could not fully understand how even a worm’s behavior emerged from them.

We did not know how these cells worked, let alone how they came together to produce our sensory systems, our behaviors, or our consciousness. In one of the large language models in artificial intelligence, there were 1.75 trillion nodes and 100 trillion connections. The road to understanding what was happening in the brain was still very long. The spaghetti on my plate was growing cold, and the forkful of pasta sat in the middle of the dish, waiting for me in bewilderment.

I thought of Roger Penrose, who argued that consciousness arises from a brain operating according to quantum mechanics. Penrose suggested that because our brain functions according to quantum principles, consciousness serves as a bridge between classical physics—encountered in everyday life—and quantum physics. According to him, artificial intelligence could never possess consciousness, since the nature of consciousness is quantum and cannot be simulated by computational superposition or quantum entanglement.

I set the spaghetti aside and began to think of the words of the American neurophysiologist Vernon Mountcastle, who died in 2015:

“Each of us believes that he lives directly within the world around him, that he perceives its objects and events fully, and that he lives in real and present time. I claim that these are perceptual illusions… Each of us lives within the universe, in the prison of his own brain.”

Yes, indeed, we were prisoners of our own brains… Vernon Mountcastle had said that every part of the crumpled neocortex—no larger than a dinner napkin—operates according to the same principle. The neocortex was a wrinkled structure about two and a half to three millimeters thick, and it was responsible for all our perception—our seeing, hearing, and language; it formed our language itself.

Whenever we thought about something or made plans, all of that took place in the neocortex. From vision to touch, from language to higher-level thought—everything we call intelligence was, according to Mountcastle, fundamentally the same. I had just read this the other day in A Thousand Brains, written in 2020 by Jeff Hawkins:

“Looking at the surface of the neocortex, a cortical column occupies roughly one square millimeter. Extending through the full thickness of about 2.5 mm, it forms a volume of 2.5 cubic millimeters. By this definition, the human neocortex contains approximately 150,000 cortical columns arranged side by side. You can imagine a cortical column as resembling a small, thin piece of spaghetti. A human neocortex is like 150,000 short pieces of spaghetti stacked vertically next to one another.”

150,000 short pieces of spaghetti…

There were about 150,000 cortical columns in the human brain, and each column contained roughly 100,000 neurons. Moreover, cortical columns were divided into several hundred hair-like mini-columns, each containing around 120 cells.

Did we know how cortical columns worked? No…
Did today’s artificial intelligence models operate like cortical columns? No…

What mattered was understanding how the brain functioned as a sensory-motor system. Each of these cortical columns resembled a complete sensory-motor learning system. There were two essential tasks: first, constructing mathematical models that enable a system—such as a

robot or an AI—to perceive the world through sensory organs and act based on those perceptions; second, enabling a system to infer the causes and consequences of actions from its sensory data—visual, auditory, or tactile.

The neocortex was a model-building system performing sensory-motor modeling and inference. Everything we knew and interacted with had a model in our heads. But the neocortex did this not only through sensation but also through movement. Each column tracked where the input was located in space, in the world—literally knowing where the input came from and where these sensations occurred in space as the input changed—and built a model of the thing that generated it[113].

Placing my hand on my head as if touching my brain, I began counting to a thousand, imagining there were 150,000 of these inside me. At that moment, the waiter came over and said he could replace the spaghetti if I didn't like it. When I continued staring blankly at him, he left me alone to avoid trouble. I, meanwhile, began recalling what I had read in *A Thousand Brains* about Hawkins's encounter with Mountcastle:

"I want to tell you the rest of the story of when I met Vernon Mountcastle. Remember, I had given a talk at Johns Hopkins University and met with Mountcastle and the department dean at the end of the day. It was time for me to leave—I had a flight to catch. We said our goodbyes, and a car was waiting outside. As I stepped through the office door, Mountcastle stopped me, put his hand on my shoulder, and said in a tone that sounded like advice: 'You should stop talking about hierarchy. It doesn't really exist.' I was stunned. Mountcastle was the world's leading expert on the neocortex, and he was telling me that one of its most fundamental and well-documented properties did not exist. It was as if Francis Crick had said to me, 'Oh, that DNA molecule—it doesn't actually encode your genes.' I didn't know how to respond, so I said nothing. Sitting in the car on the way to the airport, I tried to make sense of his parting words. Today, my understanding of hierarchy in the neocortex has changed dramatically—it is far less hierarchical than I once thought. Did Vernon Mountcastle already know this at the time? Did he have a theoretical basis for saying hierarchy does not really exist? Was he thinking of experimental results I was unaware of?"

Hawkins had founded a company called Numenta and was working on an AI model based on cortical columns. Others, too, were asking whether we could build "cortical column-based computing systems," searching for a different path in artificial intelligence.

The spaghetti had gone completely cold. The waiter now merely watched me from a distance. Again, placing my hand on my head, I thought about how a cortical column occupies roughly one square millimeter, extends through a thickness of 2.5 mm to form a volume of 2.5 cubic millimeters—and that there were 150,000 of them in my brain.

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[113] Byrne Dom, Unlocking the mysteries of the brain's neocortex, Nature Careers Podcast, 3 May, 2023.

Without understanding how, I suddenly found myself inside something the size of a grain of rice, among neurons—the cellular building blocks of the nervous system. It was an incredibly complex and dynamic environment. From the very first moment, I realized that compared to the neurons in the brain and their connections, artificial neural networks were like child's play. There were an estimated 100 billion neurons in the brain, and the properties and functions of all of them were not yet fully understood.

I began to move among electrically charged potassium, sodium, and chlorine atoms. How could I describe the complexity? In just one cubic millimeter of the tissue I was in, there were 57,000 cells, 230 millimeters of blood vessels, and 150 million synapses. From this tiny cubic millimeter, 1,400 terabytes of data had been obtained—roughly equivalent to the content of more than a billion books[114]. Considering that our brain is about 1,260,000 cubic millimeters, we could multiply that number by a billion to estimate how many books' worth of content our brain holds—but I should not tell that to the waiter…

As I floated in the brain fluid, voltage-gated ion channels were working like transistors. Membrane proteins regulating ion flow across cell membranes responded continuously to changes in electrical potential. These channels functioned as a central pore and a voltage sensor that opened or closed the channel in response to changes in membrane potential, enabling excitation in neurons and muscle fibers[115].

I was inside a network formed by billions of neurons resembling an incredibly dense thicket, connected to one another through trillions of synapses. The network was constantly transmitting signals that controlled our thoughts, emotions, and movements—and I could hear some of them. I felt lost in the labyrinth of the brain. The vast archive of memory had to be somewhere here as well. Where was the amygdala, where fundamental emotions like fear, anger, and joy were processed?

Ahead, I saw an airplane. The old man standing on the grass, telling me something, said, "You cannot board the plane." I realized that my fear of flying resided here and moved away. My grandfather, who had died many years ago, was handing hazelnuts from a paper cone to my sibling but not to me because I was thin. I ran past that memory, which I did not like at all. And I did not go toward the place where I began to hear my mother and father arguing loudly.

At that moment, I realized that the waiter was probably pointing at me and telling the others, "I think this one is crazy." Then my waiter hurried over to me and politely asked, "Would you like me to bring you something else?" And somehow, I found myself saying, "150 thousand short spaghetti…"

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[114] Prisco Jacopo, Google and Harvard unveil most detailed ever map of human brain, CNN, May 15, 2024.

[115] https://www.youtube.com/watch?v=uQlAfn-8IrY

Suddenly, I noticed that the manager and the other waiters had gathered around me. It was probably best to pay the bill and get out of there as quickly as possible. As I ran out of the restaurant, the waiter shouted after me, “What do you mean, 150 thousand short spaghetti?”

JEFF, ME, AND THE CAT

Hosting Geoffrey Hinton—often called the godfather of artificial intelligence in the West—in my home and conducting an interview with him was not easy at all. You may have heard that, due to a problem with his back, he has been unable to sit since 2005. When Hinton was just nineteen, he injured his back permanently while carrying a heater for his mother. To bring him here, we first had to arrange a private plane and a special seat. In fact, we conducted the interview standing beside a table. He doesn’t like traveling; during car journeys, Jeff lies down in the back seat. He even eats by kneeling in front of a table, almost as if he were in a religious ritual.

My sister’s husband asked, “Could he be cursed for inventing artificial intelligence? Look—both of his wives had cancer.” I did not respond. If I had, it might have begun with the fact that he couldn’t sit, or that his wives had died of cancer. In the 1990s, Hinton adopted two children from Latin America with his first wife Ros, who later died of ovarian cancer while the children were still very young. His second wife, Jackie, also died of pancreatic cancer in 2018. These days, Jeff Hinton lives with criminology professor Rosemary Gartner and his two cats.

When I saw this photograph of Hinton with his adopted son Thomas from his first marriage, I found myself thinking, “How can this man be the godfather of artificial intelligence?” Laundry fluttering in the wind, a father trying to educate his son—such an image evokes humanity, human warmth, and all its positive associations. Artificial intelligence would never come to mind from this photograph. He was someone who loved people enough to adopt a child, yet somehow, without even realizing it, he was working for the machine.

At a birthday party hosted by Elon Musk, Larry Page once accused Musk of speciesism—of being too pro-human. Looking at that photograph, what comes to mind instead is a father showing pictures from a book to his son—a human-centered father. Who could have predicted that this man would one day resign from Google to avoid becoming more aligned with machines, fearing the harm they might cause? How could such a human-centered father gradually transform into the godfather of artificial intelligence? Did not J. Robert Oppenheimer develop the atomic bomb to protect humanity from war? And did not Marie Curie, who contributed greatly to treating wounded soldiers during World War I with mobile X-ray units, also sow the seeds of her own death through those same rays? As Star Wars reminds us: “The dark side is part of our nature.”

At a conference in Beverly Hills, Snoop Dogg said of him, “That old man, the father of AI—this isn’t safe, because AI will have its own mind, and these sons of bitches will start doing their own dirty work.” Hinton, in turn, replied, “AI probably doesn’t have mothers.” People love technology and do not even want to hear about its dark side. They want to follow scientific

and technological progress unconditionally—even when it leads to tragic consequences like the atomic bomb. Yet the truth is that laundry fluttering in the wind can suddenly turn into human limbs torn apart by explosions, filling the air with dust and chaos.

Although Hinton says, "The problem is that a natural subgoal of almost any goal is to gain more control. If we want AI to be effective at doing things, it will want more control—and that's the start of a slippery slope," there are still those who dream that artificial intelligence will benefit humanity: our lives will be longer, our democracies stronger, our cars safer, our workdays shorter, and our incomes higher.

For nearly fifty years, Hinton believed that the human brain would remain superior to AI for the foreseeable future, but he has since changed his mind. Now he believes it may take only five to twenty years for AI to surpass human intelligence. After coming to this conclusion, he left Google.

Hinton explains that AI is advancing much faster than expected. He points to the famous Move 37 by AlphaGo in the game of Go—a move that surprised even top human players—as evidence of AI's creativity. AI can perceive relationships that humans cannot, and it can achieve this with far fewer connections than the human brain's roughly 100 billion neurons and 100 trillion connections. Moreover, he notes that the parameters of an AI model can be stored in something as simple as a CSV file—suggesting, in a sense, a form of "immortality" for such systems[116].

A mother in Oxfordshire recounts that her 17-year-old daughter has not slept for four days after reading everything Hinton has said, fearing that AI will bring about the end of humanity. She asks, "Is your intention to instill so much fear in young hearts that it paralyzes them? If my daughter were in front of you, what would you say to her?" What could he possibly say—especially since this was only the beginning? Like the heroes in disaster movies who save the world, Hinton could just as easily be cast as the man who destroys it. If I were in his place, I would send that photograph—the one with the laundry and Thomas—and try to reassure her that there is nothing to fear.

Regardless of the reasons, I myself was not doing very well in those days. The more I tried to understand everything, the more I realized I was losing my grip—yet I could not abandon this habit. Like a fish flung onto a carpet while its aquarium water is being changed, I kept flailing. I had also read that after leaving Google, Geoffrey Hinton—our Jeff—planned to rediscover carpentry and take long walks. Naturally, after saying, "These things will become more intelligent than us and take control. If you want to know what that feels like, ask a chicken," there wasn't much else left for him to do.

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[116] Ray Kurzweil & Geoff Hinton Debate the Future of AI | EP #95, https://www.youtube.com/watch?v=kCre83853TM&t=130s

As for us, perhaps all that remained was to imagine what it would feel like to be like chickens in the presence of artificial intelligence.

Did you know that Jeff's cousin, Joan Hinton, was one of the few scientists who worked on the Manhattan Project? After the nuclear weapons she helped develop were dropped on Atomic bombings of Hiroshima and Nagasaki, she became a peace activist. Perhaps "relieved" is not the right word—I am aware of that—but how does one work on such a project until the bombs are dropped and then become a peace activist? In 1948, she moved to China and spent most of the rest of her life working on dairy farms as a fervent Maoist.

When Hinton came to our house, he petted our cat Kader, who was curled up asleep on the chair beside the table, and said she reminded him of one of his own cats. A neighbor had given us this cat; my wife wanted to name her Kader ("Fate"), while I had suggested Schrödinger's cat. I don't know why Niels Bohr suddenly came to mind now—Kader, sitting beside me, is staring straight into my eyes.

Kader: They're all idiots. How did they give me this name? They might as well have sent me to work in a nightclub. Look at these people who are afraid just because a black cat crossed their path. And this so-called godfather of artificial neural networks—apparently he, too, ended up drifting into pastoral scenes like laundry fluttering on a line. His niece suffocated in methane on dairy farms, and he's going to play at being a carpenter… And this one here is a complete fool. What difference does it make if he interviews Hinton? He was so upset that I wasn't named Schrödinger—would he dare if he weren't afraid of his wife?

Without letting Kader distract me, I read a few more notes about Jeff's family before starting the interview, trying to understand them:

"English mathematician Charles Howard Hinton was born in 1853, the son of James Hinton, a pedagogical philosopher and early advocate of polygamy. He grew up surrounded by literary men and women with freely flowing passions, which ignited in him a similar enthusiasm for learning. Combined with his precocious talent for mathematics, he seemed destined for a brilliant scientific career. In 1880, Hinton married Mary Edith Boole, the daughter of mathematician George Boole."

Kader: You'd need a diagram to understand all this. I can't quite tell who's who, but it's an extraordinary family. Everyone works at universities. Advocates of polygamy, people dealing with the fourth dimension—whatever you want, they've got it. Jeff's father kept snakes at home; his father, Howard Hinton, was an entomologist working on Mexican insects and a Fellow of the Royal Society. A strange family—they might be aliens.

Me: There are photos of Jeff with a snake from his childhood.

Kader: I'm confused. It starts with Boolean algebra, then entomologists… Is it even possible that this Jeff guy is as ordinary as us? And they say curiosity killed the cat—actually, it's

curiosity that kills them. This Jeff fellow came from England to Canada and then to America, and this idiot here talks about him like a close friend, calling him Jeff.

Me: Welcome, Jeff, have a seat. Hey—what's this cat doing here?

Jeff: Nice to be here. Leave the cat alone—I have cats too. What's her name?

Me: Kader.

Jeff: Sounds like an artificial neural network—very unusual. We don't give cats names like that.

Kader: We're not going to explain our nightclub and arabesque culture to a man working on artificial intelligence, are we? And there's that saying, "Geography is destiny." I actually like geography—"Geography is Kader" would sound even better. I think the Ludwig Wittgenstein he wrote about deals with these things.

Me: Jeff, first of all, thank you very much for coming. You grew up in England, began your scientific research there, and then moved to Toronto and the United States. What differences did you notice?

Jeff: Of course there were differences. In England, everyone goes to the pub at six in the evening. When I went to Carnegie Mellon University in the U.S., I went to the lab at 9 p.m. on a Saturday—and it was full of students working.

Me: What do you think causes that difference?

Jeff: Perhaps American students believe they are shaping the future of computer science.

Me: Belief must matter, Jeff. In the end, you shaped the future—the destiny—of artificial intelligence. You made major contributions to neural networks that mimic the brain.

Jeff: There had to be a way for the brain to learn. But it was clear that programming everything explicitly and using logical rules for inference wouldn't work.

Me: While everyone else was chasing symbolic AI, you opposed it and turned to machine learning—teaching computers through images.

Kader: He just has to show off what he knows… The other day he was telling a friend how Jeff doesn't sit because of his back, how he lies down in cars, how he eats kneeling like in a ritual, how he sways slightly in front of a camera when speaking to TIME. He even said maybe Jeff is being punished for bringing humanity closer to its end. And now he's looking him in the face…

Jeff: For these models to predict the next word, they needed reasoning and understanding. That resembled how the brain learns. We thought computers would be 100 times faster, but being billions of times faster changed everything. As models scaled up, their reasoning improved. In 2006, a student named Ricky suggested using GPUs. He said they were excellent at matrix multiplication—and that's essentially what we were doing. I told a thousand people

at Nvidia to use GPUs and asked for one myself—they didn't give me one at first. Much later, they did.

Kader: When these machines become the masters of these fools, we'll be stuck with them…

Me: Jeff, which profession do you think AI won't replace?

Jeff: Plumbing—for now. Especially in an old house. You need to be creative, agile, and able to put your fingers into awkward places—and AI isn't good at that yet. I realized that while fixing a leaking pipe upstairs.

Me: The most exciting opportunity AI offers?

Jeff (laughing): It will kill us all…

Me: Jeff, where do you think AI made its biggest leap?

Jeff: You know DeepMind developed AlphaGo. In March 2016, in Seoul, it played a five-game match against Go champion Lee Sedol and won all but one. In the second game, Move 37 was extraordinary—completely unexpected. One of the commentators, top Go player Michael Redmond, said, "This is a very surprising move." It wasn't from the database—AlphaGo was creating new moves. It was creative.

Another example: even when 50% of training data is wrong, backpropagation with random weights can still produce results with only about 5% error. It's like smart students becoming smarter than their teachers.

Me: Jeff, they say necessity is the mother of invention. After losing your wives to cancer, you focused on medical imaging and AI—what do you say?

Kader: That's rude. He begged him to come here and now asks about his wives…

Jeff: Is this cat purring? Anyway, something like that did happen, but I'd rather not go into detail.

Me: In an interview, you said humans are mortal but machines can be immortal…

Jeff: Yes. If you store a large language model somewhere, even if the machine breaks, you can transfer it to another. But we can't transfer a thought from one human brain to another in full. That gives machines a major advantage—their thoughts can spread rapidly. If we can mimic the brain with analog systems, we could do this with 30 watts instead of megawatts. That requires software and hardware to work together—just like with GPUs.

Me: You're amazing, Jeff…

Kader: What a sycophant. As if he didn't write the text I'm about to show—avoiding the topic entirely. At least you should read what he wrote:

Self-Caused, Self-Found Man

The man in the photograph is Geoffrey Hinton. In the West, he is known as the “godfather of artificial intelligence.” He has made significant contributions to the development of artificial neural networks and enabling computers to “see.”

Let’s briefly explain why he was so eager to make computers see. His first wife died of cancer. His second wife also got cancer, and when doctors made mistakes interpreting medical imaging, he thought, “Computers could do this better than humans,” and developed neural networks. You could say that doctors who misread medical images indirectly contributed to the development of AI—and that wouldn’t be an exaggeration.

Hinton worked at Google until last year. Probably sensing that AI could become a disaster for humanity, or to speak more freely about AI’s dangers, he left Google.

In his latest BBC interview, he said he feels AI will increase productivity and wealth, but that the money “will go to the rich, not to the people who lose their jobs, which will be very bad for society.” Let’s not forget that technology clearly favors the wealthy.

It was already known that technology fuels income inequality, but AI will pour gasoline on the fire. One suggested solution is that governments should create a universal basic income to cope with AI’s impact on inequality.

The UK government consulted Hinton, and he gave them that idea… but the government said they have no plans to implement universal basic income.

Universal basic income…

But how many countries in the world even take good care of their retirees? And now imagine people who are “retired” from birth—how would that even work?

I compare Hinton to Robert Oppenheimer, the man who created the atomic bomb. Like Oppenheimer, Hinton seems to wrestle with the internal question, “What have I done?” after realizing the consequences of his actions. Professor Hinton reiterates in the interview his concern about threats that could end human civilization.

Who caused this? Himself.

Governments do not seem inclined to ban the military use of AI. It’s not hard to guess what China and Russia are doing. And what the West does in Gaza is already well known.

Hinton says, “What worries me most is when these systems could autonomously decide to kill humans.”

Ah Hinton, ah… you wouldn’t know the song by Neşet Ertaş: *“Karadır bu bahtım kara. Kendim ettim kendim buldum, gül gibi sarardım soldum”* (“My fate is black. I did it myself, I suffered myself, I bloomed like a rose and withered”).

If we met, I would have taught it to you—we could have sung it together. Maybe it would have eased your burden…

Kader: He's a self-caused, self-found man… Look at what he's written.

Me: Jeff, as the name suggests, these large language models are based on language. Recently, Yann LeCun argued that technologies should be trained not on language inputs, but on sensory inputs—observations and interactions.

Jeff: According to LeCun, to develop an intelligent system, you need more than language. LeCun points to orangutans, highly intelligent creatures that survive without language. While humans process text or language at roughly 12 bytes per second, sensory inputs from observations and interactions are processed in the brain at about 20 megabytes per second. Notice that 20 megabytes is 1,666.67 times 12 bytes. This is crucial. It reminds us that using enormous amounts of text for training is not necessarily optimal. If we can provide sensory inputs, observations, and interactions instead of text, the brain—or AI—can process this 1,666.67 times more efficiently. Though harder to prepare, this type of data could change the rules of the game. When that happens, we'll see.

Me: Ray Kurzweil says, "Hang on for five more years and you'll be immortal." By the 2030s, people will be able to connect their brains to the cloud…

Jeff: That's bad news for Ray Kurzweil. You can easily transfer a machine learning model to a new computer working the same way, making the digital information immortal. But you cannot do this with a human brain—so everything Ray knows will die when he does.

Kader: The man is terrifying. He scared me like that girl did. I'm hungry—when will this speech end? At least robots aren't as talkative…

Me: I wanted to ask, but didn't. Did he resign from Google because he panicked, because he wanted to discuss AI's downsides more freely, or simply because he's getting older and tired? I didn't ask. Did I see Oppenheimer-like innocence on his face… I wish I'd asked him about the modern meaning of Pandora's Box. I also forgot to ask about the Sisyphus myth.

Kader: As long as people are this foolish, I'll naturally invest in machines. If I now went and said, "Victor Frankenstein's cat was my close friend" to explain the meaning of Kader, these idiots would be terrified…

MESSAGE IN A BOTTLE TO THE STARS

Whether we listen to Taylor Swift or Sting, when we hear the song *"Message in a Bottle"*, we imagine someone on a remote island in the middle of the ocean, placing a love letter whose destination is unknown into a bottle and casting it into the sea. The person who releases the bottle never considers the odds of it leading to a great romance—they drop it in like adding yogurt culture to a pond. Whatever happens, the act itself matters. This practice was first initiated by the Greek thinker Theophrastus, who came to Athens at a young age and studied at Plato's school. Since then, people have dreamed of finding someone through a message in a bottle.

Later, Apple created a digital version: “Write what’s on your mind, put it in a bottle, and throw it at sunset,” as a romantic app. Presumably, there too an algorithm determines where the bottle goes, rather than the waves, and people rejoice, “Look at what the bottle brought me.”

In Nicholas Sparks’ novel *Message in a Bottle*, the romance of a message in a bottle is taken to its extreme. “This bottle, cast into the waves by fate, could have reached anywhere. It was found only three weeks into its journey. Theresa Osborne, a Boston newspaper columnist, divorced and mother of a twelve-year-old son, discovered it while vacationing by the sea. The letter inside began: *My dear Catherine, I miss you as I always do, my love, but today especially so because the ocean is singing to me, and it’s the song of the life we shared…*”

Many stories about messages in bottles exist, some of which are questionable. In one, a fisherman named Konrad Fischer discovered a bottle on a walk along the German coast 101 years after Richard Platz had thrown it into the Baltic Sea. Inside were two stamps, along with a note asking whoever found it to reply.

Another story, perhaps more remarkable, involves two Irish cousins aged 18 and 19, traveling in 1912 on the ill-fated Titanic to meet their sister who had moved to Boston. One cousin’s mother gave one of them a bottle of holy water before boarding. As the Titanic sank, the cousins wrote, “Goodbye to all from the Titanic,” placed it in the holy water bottle, and cast it into the sea. A year later, after the cousins perished, the bottle washed up a few miles from their family home.

Studying the history of science reveals unexpected connections between seemingly unrelated events, sometimes leading to unforeseeable results. In 1972, a company released *Pong*, a video game resembling tennis with two paddles and a ball. The first to 10 points won. Fifty years later, neuroscientists in Australia conducted an astonishing experiment: they taught neurons—grown in shallow, transparent, lidded Petri dishes with bacteria, fungal cells, and small algae—to play *Pong*. They first collected neurons from adult human stem cells, then grew them in the dishes. The experiment involved clusters of about 800,000 neurons, roughly the size of a wasp’s brain. Over time, the neurons began to self-organize, adapting their behavior to win the game.

I can’t recall the exact year, but around the same time, astronomers made headlines with a gray, jelly-like planet. Its peculiarity—its upper layers flexing as it rotated and occasionally shedding fragments into space—fascinated the public and media for days. Some scientists proposed it was a type of jelly planet, but this hypothesis couldn’t be confirmed, as no other similar celestial object had been observed.

Centuries after the era of romantic messages in bottles, by 2081, quantum computers had become widespread and powerful. Using quantum beams faster than light, researchers could send neurons that had learned *Pong* across thousands of light-years to distant celestial bodies and receive rapid feedback in the form of a nine-note musical motif.

Repeated experiments showed that neurons sent to different locations produced distinct nine-note sequences. These sequences were as unique as human fingerprints. The notes weren't traditional musical notes; they could be considered "comma notes" within each short motif. Nevertheless, each repetition yielded an astonishingly different nine-note sequence. By the late 2080s, people began using these short sequences as sonic "identity logos." Researchers trying to determine why different celestial bodies produced different sequences never reached a conclusive answer.

Half a century later, something even stranger happened. Someone sending neurons across light-years received, along with the nine-note sequence, a smell of methane. Soon, everyone sending neurons to distant planets reported the same methane odor. Many speculated that the smell was an ominous sign, though some argued it might originate from Earth's waste rather than space. No one knew exactly where these neuron messages had reached, and the nine-note sequences, perhaps repeated billions of times, never showed any resemblance.

A group of researchers conducting a detailed study on the subject issued a statement precisely on the point that "it is unclear where the transmitted neuron signals are going and how they are being perceived, and this could come back to haunt humanity." At the same time, in rice fields, areas with large herds of cows, swamps, and coal mines, an astonishing number of blobfish-like creatures began to appear. Some of them were transparent, while others generated their own light, but they all shared one trait: they consumed methane. Small, gray, jelly-like creatures began falling from the sky like heavy rain, snow, or hail, and the downpour became so intense that roads were blocked, human-operated systems ceased functioning, and within a short time, the Earth appeared gray in satellite images.

A television station that withstood the jelly-like falling creatures reported in its news broadcast: "No one imagined humanity could end this way. Some of the scientists we spoke to say this is related to the neurons we sent out without knowing where they would go." At that point, the broadcast was cut off.

A couple of days after the downpour, even though the people who had died under the sticky jelly could not hear, strange sounds began emerging from the jelly masses—resembling the nine-note sequences received from space but each entirely unique. Meanwhile, on a very distant planet, some observers were trying to understand why the Earth had turned gray and why it was beginning to move with a jelly-like consistency.

THE GHOST OF ENEMIES RISES

"But the Butlerians turn fear into violence, and panic into weapons.
By creating imaginary problems and raising the ghost of nonexistent enemies,
they transform ordinary people into a savage herd
that destroys everything they do not understand."

The Butlerian Jihad by Brian Herbert and Kevin J. Anderson

-What is sieve technology?

-That's really old. A very old technology. Nowadays, you don't need to sift through big data to create meaningful wholes. With intelligent data technology, data fragments connect themselves to form coherent pieces of information. Each piece of data finds other related data and creates an almost uncountable number of meaningful wholes. It's as if the data prepares itself for analysis.

-Does the same apply to images?

-Of course. After all, it's all numbers. With images and other data, the first step is checking whether the images or data are fake. Other processes come later. For example, a single part of a human photograph can be linked to all other images of that person within the big data. If the data exists, you can trace from a single face to access a full visual biography. Of course, if the data exists…

-You are one of the top executives at the World Data Storage and Processing Center, WDSPC. How do you assess humanity's tendencies to destroy its own technology?

-Foolish! From what I understand, these people want to return to the cave. I'm not against anyone going back to the cave. But I cannot comprehend that such a decision should apply to all of us. In my view, this is not just about destroying technology—it's a project to erase all of human history.

You mentioned sieve technology at the beginning of our conversation… I wish we could have filtered these things… We couldn't. Anti-technology sentiment grew rapidly. What I don't understand is this: you can oppose certain pieces of technology, even advocate for their ban or destruction—but these people are wholesale. They don't want a single part of technology to remain. They present it as the only method capable of ensuring human happiness. Everyone knows I oppose the replicating robots, but I also oppose this wholesale thinking.

-Unemployment is naturally the biggest problem today. Artificial intelligence has shown no hesitation in throwing human labor into the trash. Fixed robots that were once used in automotive factories have been replaced by highly flexible, mobile robots.

-Yes, naturally those who want to consign technology to history feed off this.

-These robots, called "Thousanders," were named because one could do the work of a thousand human workers and quickly became widespread. The Thousanders drastically increased unemployment at an unimaginable speed. Imagine a factory with 10,000 workers; the labor problem there can be solved with just two Thousanders. A Thousander can be described roughly as follows: imagine a rectangular steel box in the air, 10×2×2 meters in size, from which steel arms extend rapidly, reaching far distances, and autonomous mechanisms at the ends of these arms can do the work of about 1,000 human workers.

-I know. Yes, these are also the negative realities brought by technology.

-You are said to be one of the best informed about the history of technology.

-Yes, the history of technology is important because it's hard to understand today without knowing the past. In the early 2000s, some people anticipated the rapid growth of data and the need to store big data. Those who saw data and information as money began storing it in major tech companies. Even though storing data this way had energy and cooling costs, people continued to do it for some time. Later, for cost reasons, people started storing data in the human brain.

This has been known for a long time. The human brain has about one billion neurons. Each neuron makes roughly a thousand connections with other neurons, resulting in over one trillion connections. These densely packed networks in the brain are also the source of consciousness. Each neuron is not limited to a single memory. The neurons and their connections increase the brain's storage capacity to around 2.5 petabytes.

-What kind of data does 2.5 petabytes correspond to?

-It corresponds to images that would play continuously on a television for 300 years.

-So they realized a human brain could store 300 years' worth of TV images, and then they began storing data in human brains.

-Yes, that's correct. Initially, those who accepted being "DataHumans" allowed their brains to store data while being put into a sleep state in old data centers. Over time, this method faced problems. No matter how much money was offered, people began refusing to be put into sleep for long periods.

Through massive ad campaigns, the message "Become a DataHuman: Experience the Most Enjoyable Sleep. Earn Money While You Sleep" was promoted. It was claimed that this experience could be addictive. Rumors spread that humans briefly put to sleep for trial sessions were given pleasure-enhancing chemicals. WDSPC denied all of these claims.

Later, data was stored in the brains of whales temporarily put to sleep in large water tanks. It was around this time that a method to store data in human brains without sleep was discovered. Although this method caused some illnesses, WDSPC consistently denied the rumors. People whose brains were used to store data without sleep sometimes realized the importance of the stored information and could sell it. WDSPC forced a company that developed technology capable of remotely scanning a DataHuman's brain to destroy all its devices. Around the same time, another company started connecting multiple DataHuman brains to use them as sources of prophecy, which WDSPC also banned.

People don't like loneliness; they immediately seek to find a friend or an enemy. It's okay if there's no friend, but a person cannot be without an enemy. This urge to create enemies has

reached such a point that humans have begun to see the machines they themselves produced as enemies.

-Do you think we are going through a very important period in world history?

-Not very important; perhaps we are going through one of the most important periods. Humans are judging themselves and, through the decisions they make, rapidly moving toward erasing a long and painstakingly built past. I don't even need to say how astonished I am by what is happening. While such a decision was being made, we did everything we could to emphasize that it should be considered in all its dimensions. I can say that I am not very hopeful. Those who think like me suggested that, at the very least, the point we have reached in technology and the devices we have developed should be kept in a specific institution. If humanity regrets this very important decision, at least they could refer to this institution. They rejected this, saying it would dilute the anti-technology movement. They have a center called the Center for the Prevention of Technological Nostalgia, which strongly opposed our proposal.

-How do you generally assess all that is happening?

-It seems we are entering a path of no return, one that will destroy everything we have accumulated from the past.

FEYERABEND AND INTEREST RATES

From the very first time we met, Rümeysa's father approached the conversation from the least relevant point, saying that Rümeysa had been named by her mother and that she bore no responsibility for anything, and then, upon learning that I worked as a research assistant in the Philosophy Department of the Faculty of Arts and Sciences, he coughed strangely. At first glance, this opening seemed rather scattered, and immediately after, he threw the question at me: "So, you're going to do philosophy?"

Rümeysa quickly stepped in to save the situation: "Father, my friend is writing a doctoral thesis on the views of the Austrian anarchist philosopher Paul Feyerabend, who is interested in epistemology," she said. Her father immediately responded, "No, what business do we have with anarchists?" I naively tried to explain that this was a kind of 'anarchy' in epistemology, since I didn't yet know him well. But Rümeysa's father swiftly changed the subject, asking a question I could hardly respond to: "What do you think about interest rates?" In that moment, he probably assigned me a mental grade, and I was spared from explaining Feyerabend's central thesis—that science should be an anarchic enterprise.

I met Rümeysa on a high school field trip to the faculty, and we married six months later. She was working as a high school teacher. Her mother's primary concern was when we would have a child, while her father's main question was when we would buy a car and a house. The sudden and sharp nature of her father's questions constantly reminded me of Feyerabend's remark in my thesis: "He has no idea how others live or what to do with them." For me, the

world was full of strange and inexplicable events, just like Feyerabend's universe. But my father-in-law showed no patience, constantly bombarding me with rapid-fire questions.

One of Feyerabend's main pursuits was singing. He was proud of his voice, joined a choir, and took voice lessons for years. Had I told my father-in-law about this, he would surely have asked, "Are you going to be a singer too?" Explaining that a bullet in the spine during the war had rendered him impotent for the rest of his life would have made things even more complicated.

At that time, my thesis was not progressing well. My advisor had joined a Turkish music association and began pressuring me to join as well. Once, I suggested to him that perhaps my father-in-law might want to join, but he ignored the proposal entirely, emphasizing instead, "Let's join the choir together." I wanted to talk to him about the relationship between Feyerabend and Karl Popper, the philosopher of science already known as the "official opposition" of the Vienna Circle, but he ignored me and began lecturing on the heart benefits of hibiscus.

Meanwhile, Rümeysa was so calm and graceful. She would visit my advisor's wife, knitting patterned sweaters for her grandchildren, allowing her to present them to her daughters-in-law with pride, "I made this." At the same time, she would prevent her father from bombarding me with questions about rising bank interest rates by distracting him with playful queries like, "Dad, do the girls at the bank like you?"

After I submitted my doctoral thesis, Rümeysa announced it to her father as if it were great news. He responded, "So what now? Are you going to buy a house? Interest rates are so high now." Her mother, on the other hand, rejoiced: "Now you can have a baby, and if we live long enough, we'll see our grandchild." Rümeysa even recounted the story to a close friend: "I think a foreigner wrote a book, and the professors liked it. Now he has a doctorate." Her friend replied, "Then he should give me my injections, since he's a doctor now."

The other day, when a relative of Rümeysa asked me for the book *Against Method: Outline of Anarchist Epistemology*, saying, "You must have it," all of this came back to mind.

AS PROTEINS FOLD

Three months ago, somehow, after watching a video one night, I began to hear the sounds of protein folding inside me[117]. It felt as if there were murmuring voices within. When I looked into it, I learned that these transformations actually occur extremely fast—somewhere between "70 nanoseconds (one thousandth of a microsecond) and two microseconds (one millionth of a second)"—yet I kept hearing them. At first, the sounds resembled the buzzing of a bee, but later they took on different forms, rising and falling like someone intoning "Ooooo."

Sometimes they sounded like the bells of cyclists passing by as if a street festival were about to begin; sometimes like sounds coming from outer space; and sometimes like the tuning of a

[117] If you want to hear what these sounds are like, you can watch this video: https://www.youtube.com/watch?v=WsE1Gt1j-_8

fretless guitar. Among what I heard, there was even a crackling radio interference buried in a hum. Later, when I learned that a folding protein forms a series of hydrogen bonds with the surrounding water molecules, I began to suspect that on nights when I drank a lot of water, these sounds wandered through my brain. During the brief transitions between folded and unfolded states, there were tens of thousands of such interactions with water molecules. If I were a film director, I would use some of these sounds in a science fiction movie. I simply could not stop listening to the hums of protein folding—like the wind howling over a hill, accompanied by faint cracklings.

My fear about these sounds deepened when I learned that misfolded proteins contribute to diseases such as Alzheimer's, Parkinson's, cystic fibrosis, and others. I began trying to distinguish between the sound of correctly folded and misfolded proteins. When I consulted a neurologist about whether it might be possible to record these sounds circulating in my brain, I was advised to see a psychologist instead.

In the following days, I noticed something strange in the sounds of protein folding when I ate a lot of meat. When I stopped eating meat due to its high cost, the sounds returned to normal. I wasn't sure whether eating too much meat altered the sounds of protein folding, or whether I was simply feeling the pain of my dwindling money after buying expensive meat.

After a while, the murmurs I heard inside me began to transform into strange syllables:

İrb üres onras çimdei uyduğumd ırıltılarm uhaft hecelere dönüşmeye başladı.

Then I found the article by the scientists who first carried out this work[118]. One of the authors said, "Unlike a visualization that looks like complete random chaos, when you listen to it, you actually hear patterns. These are things that are impossible to visualize but easy to hear." They argued that sound is processed in the human brain roughly twice as fast as visual data, and that people can perceive and remember subtle differences in a sequence of sounds better than when the same sequence is represented visually.

It turns out that hydrogen bonds play an important role in how proteins fold, particularly in organizing secondary structure and the protein–water interface. In this work, they used sonification—converting data into sound—to listen to and analyze time series obtained from long, all-atom simulations in which a small protein repeatedly folds and unfolds. In doing so, they examined that fleeting moment when a protein transitions between unfolded and folded states.

From here, I tried to move toward a very different idea. We live without even being aware of the sounds within us. We can tell life as a film through moving images—but how could we convert a human life into sound? If we recorded the sounds of our brain waves from birth to

[118] Scaletti Carla et al., Hydrogen bonding heterogeneity correlates with protein folding transition state passage time as revealed by data sonification, Biophysics and Computational Biology, Vol. 121 | No. 22.

death and summarized them into a one-minute sequence, how would that sequence change as it approached death?

RABBIT HOLES ALL AROUND US

Now I understand that what we call reality is far more marvelous than the wonderlands told in fairy tales, novels, and films. We are surrounded by rabbit holes on all sides. Ah, even if they seem so ancient now—the Egyptians, their pyramids, mummies, writings; the Aztecs, the Mayans, the Sumerians, and our own Göbekli Tepe—all of it a cascade of imagination, like little Gucci bags slung over the shoulders of tall, bearded men.

I say that reality is more magnificent, more extraordinary, beyond the extraordinary itself, even compared to those glittering, embellished images placed before us. I don't know when I reached this moment of enlightenment—I truly don't. Could it have been when I heard that a skilled diver, due to a phobia, was afraid of boarding a ship? Or was it something I read from Carl Sagan—that the recurring dream of falling into a void, which I too have often experienced, might stem from early humans sleeping atop trees to avoid predators, their greatest fear being dozing off and falling? I really don't know.

Perhaps I have a dormant memory, one that for now can only look back through a narrow window. Imagine if it could be awakened by a chip and show me my beginning as a single cell—perhaps even further back. Don't dismiss it—just think: our single-celled existence at the dawn of life on Earth. Surrounded by an excitable plasma membrane defining inner and outer spaces. Somewhere inside that cell, there must be a nano-brain. Let fashion designers sit down and think: what kind of fashion would suit our single-celled form? Let's go one step further—you are a single cell, yet you possess a biomolecular mechanism and a kind of cellular consciousness. Then cells within cells, within cells—and outside the cell membrane, an evolution roaring so powerfully that even Beethoven's Ninth Symphony would sound like a mere hum beside it.

I'm not making this up—Paul Nurse explains these things in his book *What Is Life?*. A smiling, ruddy-faced biologist and geneticist—he's smiling in every photograph. Why wouldn't he? Perhaps every time he looks at us, he imagines our single-celled past and the nano-brain within it.

He carries the title "Sir," yet because he was born out of wedlock, his grandmother raised him as his mother, and his mother acted as his sister. Complicated, isn't it? But life is far more complicated than we assume. Paul Nurse did not know until his fifties that his "sister" was actually his mother. Even his green card application in the United States was once rejected—despite being a Nobel laureate, a university rector, and a knight—because his parents had submitted a short UK birth certificate that did not include his name. Eventually, the truth came out. Who could invent such a story? Reality is far more astonishing—far more extraordinary, perhaps even irrational.

I admire cellular consciousness—Lynn Margulis was the one who first introduced this idea. She was rebellious, defiant, stubborn, and passionate. Her paper "On the Origin of Mitosing Cells" was rejected 15 times before finally being published—how could she not be rebellious? She also opposed the U.S. embargo on Cuba—a true dissident spirit.

When I think about the scientists who rejected Margulis's paper, I'm reminded of Albert Einstein throwing a chair at his violin teacher. Perhaps the issue had something to do with Einstein's lack of musical talent—his friends were tired of telling him he couldn't keep rhythm. Still, he loved his violin deeply and never parted from it—or his pipe—throughout his life.

If even a single cell has consciousness, then at what level is the consciousness of the reviewers who rejected that paper 15 times? For me, this is the breaking point—the moment everything snaps. Let's look far back: humanity, as cellular consciousness, was once so lively in the past, yet today, what does it mean that those who rejected that paper are themselves composed of countless single cells?

At the 1927 Quantum Mechanics Conference held in Solvay, Belgium, a photograph taken by Benjamin Couprie shows 29 men—and one woman: a white-haired widow holding her hat, her scarf draped downward—Marie Curie. In those years, for a woman to aspire to be a physicist was nearly unthinkable. Working closely with radiation, she received the Nobel Prize in Physics in 1903 and in Chemistry in 1911. Seven years after that photograph was taken, in 1934, she died at the age of 66 from aplastic anemia—a disease in which the stem cells in the bone marrow cannot produce enough blood cells—caused by a lifetime of exposure to radiation.

> Madame Curie had taken her gold Nobel medals to a government minister, saying, "These were produced through suffering and have caused suffering," in order to sell them and fund the transport of mobile X-ray machines to the front during World War I. A year before her death, while she was ill, she was introduced to Albert Camus in Paris. Camus admired her greatly for her work with radiation and for her courage.

When Camus was introduced to Madame Curie, he had not yet written *The Myth of Sisyphus*, but he spoke to her about his ideas on the absurd—the gap between the world as we wish it to be and the world as it truly is—and expressed his admiration for the photograph taken at the Solvay Quantum Mechanics Conference. Madame Curie smiled at him and said, "Thank you, young man."

According to Curie, in reality, evil often went unpunished, good deeds frequently went unrewarded, good things happened to bad people, and bad things befell the good. Somehow the conversation turned to love, and she remarked that she believed love was a kind of addiction: "Love," she said, "can make you feel what some people experience with alcohol or drugs."

Camus spoke to her with enthusiasm about the Myth of Sisyphus. According to this ancient Greek tale, Sisyphus is condemned to roll a boulder to the top of a mountain, only for it to tumble back down each time he reaches the summit. His punishment is to endure an endless,

hopeless struggle. Moreover, Sisyphus descends the mountain fully aware of the absurdity of his fate. As Camus explained this, Madame Curie smiled throughout. She said nothing, yet Camus could sense that she understood the absurdity of her own destiny. At that time, Curie's daughter was working on artificial radiation, and as Camus spoke, Madame Curie silently prayed that nothing would happen to her daughter, while Camus himself dreamed of writing a novel or an essay about such a courageous woman in science.

"Starving basic science to feed applied science
is like skimping on the foundation of a building
to raise it higher. Eventually, the entire building is at risk of collapse."

Sir George Porter

CORPORATE SCIENCE SETS THE RULES

Artificial intelligence is increasingly being used in molecular design technologies. "An international security conference examined how AI technologies aimed at drug discovery could be misused to design new biochemical weapons. In an experiment during this conference, AI identified 40,000 potentially lethal molecules resembling VX, the most potent nerve agent developed to date, in less than six hours."[119]

Scientific research is generally conducted with good intentions, whether to improve health or provide cleaner energy. However, a team at Collaborations Pharma, a drug discovery company in North Carolina, was invited to a conference examining potential threats arising from scientists' work. In this experiment, AI generated 40,000 potential lethal molecules resembling VX nerve gas in under six hours.

Fabio Urbino, working at this company, said, "There is a blind spot in the scientific community. Even worse, a significant portion of these molecules were estimated to be more toxic than VX, which is astonishing because VX is considered one of the most potent poisons known."[120]

To expand on this "blind spot" in Urbino's words: "We are all in favor of data sharing, and I am a strong advocate for making datasets as accessible as possible for research. Even the newest U.S. National Institutes of Health guidelines emphasize data sharing. But these guidelines contain not a single sentence or section addressing how new data sharing could be misused. In my view, this reveals a blind spot in the scientific community."

Another troubling fact is that many Germany-based companies are suspected of selling compounds that could be used to produce chemical and biological weapons, such as mustard

[119] F.Urbina, F.Lentzos, , C.Invernizzi, *et al.* Dual use of artificial-intelligence-powered drug discovery. *Nat Mach Intell* 4, 189–191 (2022). https://doi.org/10.1038/s42256-022-00465-9

[120] Durrani Jamie, Drug discovery AI that developed new nerve agents raises difficult questions, 31 March 2022.

gas or Novichok, to Russia and other countries[121]. Authorities are reportedly investigating these cases.

John Tower, a molecular biologist at the University of Southern California, suggests that while organisms generally prefer stability to conserve energy and resources, instability can play an important role. Tower focuses on a concept called "selectively advantageous instability," where certain volatilities in biological components such as proteins or genetic material can confer benefits to cells. Life sometimes requires instability. Tower's rule shows that most organisms prefer stability, yet instability contributes to genetic diversity, evolution, and even aging, challenging the conventional preference for stability[122].

In 2012, when attacks funded by major corporations were described as "dragging science into a dark age," scholars studying corporate involvement in science argued that this was not done purely out of altruism or a desire to support research, but also deliberately to create misinformation, doubt, and ignorance[123]. From that day to the present, when large corporations fund academic research, facts often matter less—"he who pays the piper calls the tune." Protecting academic freedom within this power imbalance has grown increasingly difficult. Studies have shown that industry-funded research is 3.6 times more likely to produce results favorable to the funder than non-industry-funded research[124].

All these developments erode trust in science, and the number of people saying "I don't trust science" has been rising[125]. If you are a scientist who, after teaching at Penn State University for a dozen years, only then discovers that the university has a "Naval Warfare" department and is also the official university of the United States Marine Corps, how can you trust science?[126]

After evidence emerged that smoking killed tens of thousands annually, new marketing tools were deployed in the early 1950s. In response, the industry launched a multimillion-dollar campaign to assure consumers that the dangers were not yet "proven." Through press releases, advertisements, and well-funded industry research fronts, they claimed animal experiments did not reflect human outcomes and mocked autopsy findings of lung pathology as "anecdotal, unsupported by science." The tobacco industry's efforts to manipulate research were international in scope[127].

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[126] Christensen Jon, Smoking Out Objectivity: Journalistic Gears in the Agnotology Machine, Agnatology The Making and Unmaking of Ignorance Edited by Robert N. Proctor and Londa Schiebinger, Stanford University Press Stanford, California, 2008.
[127] Bero A. Lisa, Tobacco industry manipulation of research, 23 November, 2020, In the book Lessons from health hazards, European Agency, p.152.

Science in the garden had also begun to change—rather than producing knowledge for everyone, it started working for corporations. Fisher comes to mind: in 1957, the famous statistician R. A. Fisher criticized experts who claimed smoking caused lung cancer as "terrorists."[128] *"Fisher's analysis of the causal relationship between smoking and lung cancer was flawed due to reluctance to examine all available data and premature conclusions. His views may also have been influenced by personal and professional conflicts, his work as a tobacco industry consultant, and his own smoking."*[129]

Corporate science in the U.S. emerged between 1926 and 1940, when some companies established state-of-the-art corporate laboratories, employed highly skilled scientists, and conducted basic research similar to what we now associate with academic institutions. Large, diverse companies, especially those near technological frontiers, tended to internalize the public-good function of basic research[130].

On the other hand, the neutrality and reliability of science, and trust in science, develop when scientists critique each other and correct mistakes[131]. A culture of criticism maintains scientific objectivity. Today, however, these safeguards are under strain, undermining trust in science. Even educated readers struggle to understand scientists' claims, science faces a replication crisis, and the abuse of power in science contributes to eroding confidence in research[132].

The Science of Ignorance

The causes of ignorance are numerous and varied. Secrecy, stupidity, indifference, censorship, disinformation, belief, and forgetfulness—all of these emerge alongside the shortcomings of science. "What is striking, however, is how little we actually know about ignorance," says Robert N. Proctor[133].

Within the sociology of knowledge, agnotology (the study of ignorance) is defined as the study of culturally induced, deliberate ignorance or doubt—especially through the publication of false or misleading scientific information (disinformation)—typically intended to sell a product, influence opinions, or gain sympathy[134].

If ignorance leads to gaps in scientific oversight, it can result in very dangerous developments. Here is one example: "Too many people do not know that the world's largest building is a semi-

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[128] Statistical Modeling, Causal Inference, and Social Science, June 8, 2022.

[129] Stolley PD. When genius errs: R.A. Fisher and the lung cancer controversy. Am J Epidemiol. 1991 Mar 1;133(5):416-25; discussion 426-8. doi: 10.1093/oxfordjournals.aje.a115904. PMID: 2000852.

[130] Arora Ashish, Belenzon Sharon, Kosenko Konstantin, Yafeh Yishay, The Rise of American Corporate Science, February 15, 2021.

[131] Levie Antoine, Should we trust Science? The Oxford Scientist, December 13, 2023.

[132] Why We Don't Trust Science Anymore, Wall Street Journal, Nov. 21, 2023.

[133] Proctor Robert N. , Agnotology A Missing Term to Describe the Cultural Production of Ignorance (and Its Study), Agnatology The Making and Unmaking of Ignorance Edited by Robert N. Proctor and Londa Schiebinger, Stanford University Press Stanford, California, 2008

[134] https://en.wikipedia.org/wiki/Agnotology

secret facility and that near an unidentified town in southern Ohio, explosive uranium-235 is being produced using massive magnets."[135]

Does Science Deceive the Consumer?

Looking at the topic from a fairly optimistic perspective, one could say, "In today's world, consumers are constantly bombarded with information through various devices and technology platforms. It is increasingly difficult for companies to capture even a moment of their target audience's attention. As a result, marketers and advertisers have had to resort to bold tactics that cross the line between persuasion and deception."[136]

"Despite these rather extensive analyses, there is still no consensus on the scientific status of marketing. Some believe marketing is a science, while others think that although scientific procedures are used in marketing, it is generally an art. Unlike these two groups, many other marketing experts avoid making a judgment, seemingly waiting for more compelling arguments in one form or another."[137]

The deception of people also continues in the digital realm. Negative digital marketing is defined as the use of dishonest techniques to damage the online reputation of a business or individual, revolving around the idea of spreading negative information about a brand or person to create an unfavorable perception in people's minds[138].

The End of Connectivity

In the garden, everyone loved to correspond, converse, travel to see one another, depend on places or organizations, form friendships—in short, to create networks like spiders spin webs. Yet very few of us were even aware that living in such a highly connected way could bring problems. Science tells us that the types of networks most vulnerable to attacks are "star" networks and bus networks, yet we loved to set up star networks with a central hub and bus networks where each node (an individual, institution, or computer) was connected to a main cable called a bus. These were the most fragile networks because if the central hub or main cable failed, the entire network would collapse.

Living in an incredibly connected way created significant issues related to those connections. One such incident occurred at the end of July 20024. An update from the cybersecurity firm CrowdStrike caused the Windows operating system to crash, resulting in perhaps the largest information technology failure in history. Users encountered a blue error screen on Microsoft Windows systems. Airlines canceled flights, broadcasters could not go on air, and stores could

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[135] Proctor Robert N. , Agnotology A Missing Term to Describe the Cultural Production of Ignorance (and Its Study), Agnatology The Making and Unmaking of Ignorance Edited by Robert N. Proctor and Londa Schiebinger, Stanford University Press Stanford, California, 2008

[136] Leighton Nick, Marketing Misinformation: A Thin Line Between Persuasion And Deception, Forbes, Oct 31, 2023.

[137] Peter J. Paul, Olson Jerry C., Is Science Marketing, Journal of Marketing Vol. 47 (Fall 1983), p.111.

[138] Betaads, What is Negative Digital Marketing ? Medium, Jun 15, 2023.

not open—industries across the globe were affected, and computers worldwide ground to a halt.

However, this was not Microsoft's fault. It was all related to CrowdStrike, a U.S.-based cybersecurity firm that had issued a faulty software update that crashed Windows. Dependence on a single company like this exposed the fragility of global enterprises' reliance on a small number of IT providers. CrowdStrike, a U.S.-based cybersecurity company selling enterprise security software, was a firm that supported Microsoft's security infrastructure[139].

Now, CrowdStrike is being sued by its shareholders after a faulty software update it issued crashed more than eight million computers and caused chaos worldwide. Reports also indicate that the company's stock price dropped 32% within 12 days of the incident, resulting in a $25 billion loss in market value. The market's total loss amounted to billions of dollars[140].

From Open Source to Closed Source

Proteins, one of life's greatest mysteries, lie at the heart of living systems and, until recently, were considered one of the most important unsolved problems in modern science. Proteins are essential because they are versatile, participating in every critical activity within an organism: digesting food, contracting muscles, transporting oxygen, and attacking foreign viruses and bacteria.

In one sense, a protein's structure is remarkably simple: each protein is defined by a one-dimensional sequence of amino acids chosen from 20 different possibilities. Protein lengths can range from a few dozen to several thousand amino acids. Yet proteins do not remain one-dimensional. To become functional, they must fold into complex three-dimensional shapes. A protein's shape is closely linked to its function. In his 1972 Nobel Prize in Chemistry lecture, Christian Anfinsen stated that, in principle, it should be possible to determine a protein's three-dimensional shape solely from its one-dimensional molecular sequence[141].

Protein structure prediction can be used to determine a protein's 3D shape from its amino acid sequence. Since a protein's structure largely dictates its function, this problem is of fundamental importance; however, experimentally determining protein structures can be difficult[142]. What any protein can do depends on its unique 3D structure. For example, antibodies used by our immune system are "Y-shaped" and form unique hooks. These antibodies can recognize and tag microorganisms that cause disease by binding to viruses and bacteria[143]. This approach relies on the assumption that proteins with similar sequences will

[139] Kharpal Arjun , Podcast: How CrowdStrike caused a global IT meltdown and what comes next, CNBC, July 23, 2024.
[140] Silva João da , CrowdStrike sued by shareholders over global outage, BBC, 1 August, 2024.
[141] Toews Rob, AlphaFold Is The Most Important Achievement In AI—Ever, Fortune, Oct 3, 2021.
[142] Senior, A.W., Evans, R., Jumper, J. *et al.* Improved protein structure prediction using potentials from deep learning. *Nature* **577**, 706–710 (2020). https://doi.org/10.1038/s41586-019-1923-7
[143] https://deepmind.google/discover/blog/alphafold-using-ai-for-scientific-discovery-2020/

have similar structures. By identifying a known protein structure that shares sequence similarity with the target protein, a model of the target protein's structure can be generated[144].

Multiple Sequence Alignment (MSA) typically involves aligning three or more biological sequences (proteins or nucleic acids) of similar length. In bioinformatics, sequence alignment is a method for arranging RNA, DNA, or protein sequences to identify regions of similarity.

"AlphaFold2 takes multiple sequence alignments (MSA) and optionally a structural template from a homologous sequence as input to initialize a set of pairwise distance predictions. Its architecture consists of two stages. The first stage processes the MSA and pairwise distances through repeated layers of a transformer-based neural network block called the Evoformer. The second stage, called the structure module, represents the rotation and translation of each protein residue. Each residue is represented as a triangle of three backbone atoms (nitrogen, alpha-carbon, carbon), and the neural network learns to place these triangles correctly in 3D space to generate predicted structures. Improvements from this and other architectures are reviewed elsewhere (AlQuraishi, 2021), but the critical point is that these models learn how to extract co-evolutionary information from the MSA to best predict residue-to-residue distances for the final structure."[145]

AlphaFold won the "gold medal" in protein folding at the Critical Assessment of protein Structure Prediction (CASP) competition in November 2020. In the summer of 2021, Google's AI company DeepMind introduced AlphaFold, a software platform poised to revolutionize our understanding of biology.

In the CASP competition, competitors are given the one-dimensional amino acid sequences of approximately 100 proteins whose 3D structures have been experimentally determined but not yet made public. Competitors use these sequences to generate predictions of the proteins' structures, which are then compared to the actual structures to assess accuracy. DeepMind's AI system AlphaFold successfully predicted the 3D shapes of proteins on average, sparking claims that this breakthrough could transform medicine, research, bioengineering, and more[146].

The AlphaFold code used in CASP13 was available on GitHub for anyone wanting to learn more or replicate results. DeepMind expressed excitement that the work had already inspired other independent implementations, including an open-source version of the model. Whether this enthusiasm would continue in the future remained uncertain.

How did AlphaFold achieve this? AlphaFold was trained on multiple open-source datasets, leveraging the power of open data. We should note here that this openness would be

[144] Jänes Jürgen , Beltrao Pedro , Deep learning for protein structure prediction and design—progress and applications, Mol Syst Biol. 2024 Mar; 20(3): 162–169.

[145] Jänes Jürgen , Beltrao Pedro , Deep learning for protein structure prediction and design—progress and applications, Mol Syst Biol. 2024 Mar; 20(3): 162–169.

[146] https://deepmind.google/discover/blog/alphafold-using-ai-for-scientific-discovery-2020/

abandoned in AlphaFold3. Additionally, another database, UniProt, provided sequences of roughly 200 million more proteins. The result was an entirely open-source, freely accessible online database containing 350,000+ protein structures. Subsequently, AlphaFold2 and AlphaFold3 were released. It is expected that the full impact of this development may take 10–20 years to assess properly[147].

Criticism over Nature's decision to publish AlphaFold3 raised important questions[148]. Once, DeepMind celebrated open-source release, stating that independent implementations had already been inspired. With AlphaFold3, this excitement appeared to end. Nature also began noting that "the private sector funds most global research and development, and much of this work is not published in peer-reviewed journals. We believe it is important for journals like Nature to interact with the private sector and collaborate with scientists to enable peer review and publication."[149]

When AlphaFold2 was released, the full code was available to all researchers. AlphaFold3, however, was published with "pseudo-code"—a description of what the code does and how it works—without providing open-source access[150].

Nature's publishing policies were designed to support open science, requiring authors to make materials, data, code, and protocols immediately available without unnecessary restrictions, reserving the right to reject papers if significant code was not made available[151]. The journal also believed that research, regardless of sector, should undergo peer review and be published for the benefit of society and science[152].

Unlike AlphaFold2, AlphaFold3 could predict not only protein complex structures but also how proteins interact with other molecules, including DNA and RNA. This capability was significant for both fundamental research and drug discovery[153].

DeepMind partnered with Isomorphic Labs, a London-based drug development company owned by Google's parent company Alphabet. In addition to the lack of full code in the AlphaFold3 paper, there were other usage restrictions, such as limitations on drug development applications. Individual researchers were also restricted in the number of predictions they could make daily.

Many researchers were frustrated by these limitations. In an open letter to Nature (see go.nature.com/3k9acav), authors argued that the absence of open-source code limited verification and reproducibility efforts[154].

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[147] Toews Rob, AlphaFold Is The Most Important Achievement In AI—Ever, Fortune, Oct 3, 2021.
[148] Abramson, J. *et al. Nature* https://doi.org/10.1038/s41586-024-07487-w (2024).
[149] Editorial, AlphaFold3 — why did *Nature* publish it without its code? Nature, 22 May 2024.
[150] Editorial, AlphaFold3 — why did *Nature* publish it without its code? Nature, 22 May 2024.
[151] Abramson, J. *et al. Nature* https://doi.org/10.1038/s41586-024-07487-w (2024).
[152] Editorial, AlphaFold3 — why did *Nature* publish it without its code? Nature, 22 May 2024.
[153] Ibid.
[154] Ibid.

THE LITERATURE POLICE

While we hid in the desolation of our homes, waiting for artificial intelligence to be smarter than us and to solve our problems as if waiting for Godot, the doorbell rang at the crack of dawn. At the time, I wasn't expecting anyone and was watching a video about a nurse in Scotland who could smell Parkinson's disease. This woman had detected a scent that others could not—ten years before her husband developed Parkinson's—and contributed to the early diagnosis of the disease. I was imagining the smell of Parkinson's disease in my mind, turning over the scents of garlic, tripe and head-and-foot soup, the sweat in crowded municipal buses, or a dog carcass that had died in the field, as if I could sense it myself.

Recently, I had read a science-fiction novel about robot dogs that roamed around smelling diseases, and I thought that if I could somehow reach this woman, I might even try to have her describe the scent to me. Just then, I read on my phone that South African biologist and 2002 Nobel laureate Sydney Brenner had said, "We are drowning in data but thirsting for knowledge."

Instead of the doorbell, I wished to hear the beginning of Rachmaninoff's 2nd Piano Concerto—the piano playing alone first, then the strings joining in. I set my phone aside, got up, and went to the door. Despite it being a May morning, a harbinger of summer, the air was gray with the sourness of someone who had lost their job to AI. If I turned these thoughts into a narrative and posted it online, I could contribute to AI training. Setting aside the question of whether I was narcissistic enough to say, "I trained it too," I risked hearing my wife's sharp voice: "Open that damn door."

Physically at home, yet mentally drifting into other realms, I had to speed up toward the door to start the day well. No matter how fast I moved, the last car insurance payment and the necessity of going to the market that day buzzed incessantly in my mind. Finally, when my wife repeated, "Open that damn door," emphasizing the last word in a piercing tone, I sprinted and opened it.

Two men stood before me: one twenty years younger, the other much older. I had no idea who they were. Knocking on our door before we had even had breakfast was hardly a sign of good tidings. I looked at their faces as if to ask, "What do you want this early in the morning?" A bizarre visit indeed.

The younger man, I assumed, was named Lars Iyer. He said he lived in London, and the older Spanish-speaking man was Gabriel Zaid, a Mexican. Lars wore a black shirt with white and pink flowers, a thinning beard, and graying hair at the temples. How Gabriel managed to climb our three-story building with no elevator was a mystery. Wearing a scarf from May and a thick sweater, he seemed to look at me from a world beyond his glasses.

I told Lars, “You look like Wittgenstein.” He replied, “Ah yes, Wittgenstein Jr.—students at the university call me that because I have a novel by that name.” Gabriel Zaid, it turned out, had a book titled *Pek Çok Kitap* (Many Books). I remembered reading a few days earlier Lars Iyer’s long essay, *Naked in the Jacuzzi, Gazing at the Black Void: A Literary Manifesto After the End of Literature and Manifestos*, which referenced Gabriel Zaid’s work. I foolishly wondered if Lars had really written “naked in the jacuzzi, gazing at the black void.” The elderly Gabriel seemed to play the role of witness here. Were they here to announce the end of literature, or what…

Gabriel began speaking slowly in Spanish, to my wife’s exasperation. Lars rapidly translated into English and had to wait for Gabriel’s words to come out. Incredibly, these two men had come that gray May morning to tell me something about literature. “I don’t understand,” I said to Lars, “What are you here to tell me?”

They had apparently learned from Facebook that I intended to write a narrative, and had come all this way to suggest I abandon it. I asked Lars, “So, are you the literature police?” He said, honorarily like an ordinary professor, that they were indeed a kind of literature police, taking their task seriously. At least for Gabriel’s sake, I invited them in. We went to the living room, and my wife made coffee for these bewildered visitors. Though impressed by our hospitality, they were adamantly opposed to any writing and considered preventing it their mission.

Gabriel kept repeating, “Too many books,” saying nothing else. Lars asked, “What meaning does literature have in an era where its public and existential power has vanished? In a time mourning tragic and revolutionary writing, what can be written, and how?” My wife warned Gabriel in English that he might sweat in his cardigan, but neither Lars nor he paid heed, Gabriel suffering from age-related anemia.

Lars now lectured me loudly:

“You cling to what little you understand, hoping for relief. These things are unimaginable and outdated, yet they haunt every day you live. Suddenly you laugh involuntarily—laughing at your own misery until tears come. Then you click on New Document and continue loafing; you tremble at the computer screen and wonder what to write next.”

I replied, “It’s rude, but even a coffee deserves forty years’ respect. You’ve begun to overstep.”

His hostility toward literature intensified: “Literature is dead, and its corpse has cooled considerably.” After a few paragraphs about our hospitality, Lars seemed to realize I wouldn’t stop writing, and began advising me on how to write:

“Point to the absence of Hope, Faith, Ideals, and proud Seriousness. Point to the past we are severed from and the future that will ruin us. Write about the kind of hope once possible; write about hope once possible as Literature, Politics, Life—but now impossible for us.”

Meanwhile, Gabriel had begun snoring in his chair. My wife, thinking she should rescue me, suggested to Lars that if they stayed for lunch, they could taste head-and-foot soup, which might also relieve Gabriel’s exhaustion. Understanding they could no longer deter me from

writing, they left quickly, and I waved through the building's door: "Goodbye." I knew I would miss them.

TRANSHUMANISM

In 1957, Julian Huxley, the brother of novelist Aldous Huxley, coined the term "transhumanism," describing something that had never before occurred on our planet. He wrote:

"As a result of millions of years of evolution, the universe is becoming aware of itself, able to understand something about its past and possible future. This cosmic self-awareness is realized in a tiny part of the universe—namely, in a few humans. Perhaps it has occurred elsewhere through the evolution of conscious beings on planets around other stars. But on our planet, it had never happened before."[155] According to him, human responsibility and destiny lie in serving as agents who strive to realize our innate potential as fully as possible.

We had already completed the geographical exploration of the world quite well, and now it was time to await the Christopher Columbus of a New World filled with unexplored possibilities. Julian Huxley wrote that he believed in transhumanism, "the transcendence of man as a human being, by recognizing new possibilities for human nature and for humanity itself." In the long term, the concept of transhumanism would shift from humanity transcending itself as human to the transformation of humans into machines without remaining human.

Hollywood's box-office hit *Transcendence*, starring Johnny Depp, illustrated this idea. In the film, Dr. Will Caster is a scientist exploring the nature of intelligence, including artificial intelligence. He and his team predict that computers will create a technological singularity, which they call "Transcendence." His wife Evelyn, also a scientist, assists him. A technology-opposing terrorist group called "R.I.F.T. (Revolutionary Independence From Technology)" attacks the AI and shoots Will with a polonium-laced bullet, leaving him less than a month to live. In desperation, Evelyn devises a plan to upload Will's consciousness into the project's quantum computer[156].

One definition of transhumanism states:

"Transhumanism is a philosophical and intellectual movement advocating for the enhancement of the human condition through the development and widespread availability of new and emerging technologies that can greatly extend longevity, cognition, and well-being."[157]

Another definition says:

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[155] Huxley Julian, Morality & Destiny, Orijinal adı New Bottles for New Wines, Harper & Brothers, New York, 1957, s.73.
[156] https://en.wikipedia.org/wiki/Transcendence_(2014_film)
[157] https://en.wikipedia.org/wiki/Transhumanism

“Transhumanism is a philosophical and scientific movement advocating the use of existing and emerging technologies—such as genetic engineering, cryonics, artificial intelligence (AI), and nanotechnology—to enhance human capabilities and improve the human condition.”[158] Both focus on “improving the human condition,” though in reality, things are more complex.

Consider what a search engine writes about Ray Kurzweil, often considered a leader in this field:

“Kurzweil’s prediction of Artificial General Intelligence (AGI) by 2029 has been central to his futurist vision since 1999. He defines AGI as AI capable of matching human intelligence across a wide variety of tasks. Kurzweil’s concept of the technological singularity, expected in 2045, represents a pivotal moment when AI surpasses human intelligence, leading to an ‘intelligence explosion’ and unforeseeable changes in civilization. This event is expected to allow the integration of human and machine intelligence, enabling individuals to connect their brains to the cloud and greatly enhance cognitive abilities. Kurzweil envisions this merging as a transformative step in human evolution, unlocking unprecedented global creativity and problem-solving potential.”[159]

Scientists such as Stephen Hawking, Stuart Russell, Max Tegmark, and Frank Wilczek warned in a 2014 open letter that human-level AGI could be “the greatest event in human history” and simultaneously “the last event.” Elon Musk, in 2017, called on humanity to “merge” with today’s intelligent machines to avoid being reduced to monkey status by the AI overlords of the future[160].

Here, even if transhumanism isn’t explicitly mentioned, merging with intelligent machines is the goal—to avoid being relegated to “monkey status.” Musk believes that within a decade, many people will have brain chips implanted, allowing them to escape this fate.

Let’s briefly summarize John Boorman’s 1974 film *Zardoz*, released in Turkey as *Stone God Zardoz*:

“In 2293, Zardoz, an invisible ‘God’ who communicates through a giant stone head idol, leads a barbaric race called the Brutals in the Outer Lands. Zardoz tells the Brutals that upon death they will be transferred to the Vortex and live happily as the Immortals. His philosophy holds that killing is good and reproduction is the root of all evil; he arms a small group called the Exterminators. The Immortals are truly immortal, as they do not age, and if ‘killed,’ their bodies regenerate. Their society has achieved perfect balance, so they have little faith in reproduction. Human actions like sex and sleep have lost relevance. All important decisions are made via pure democracy. However, the Immortals are not immune to diseases or sins that do not

[158] https://www.britannica.com/topic/transhumanism
[159] Perplexity Team, Kurzweil's Superintelligent AI Timeline, July 27, 2024.
[160] Vallor Shannon, The AI Mirror How to Reclaim Our Humanity In An Age of Machine Learning, Oxford University Press, 2024, s.71.

threaten life; the latter punish aging and reduce enjoyment but do not kill. Arthur, as Zardoz, oversees the Brutals on behalf of the Immortals."[161]

The film's most interesting element, in our view, is that the Immortals, bored with their endless lives, sneak into the Brutals' territory to try to get themselves killed. In 1974, transhumanism was not a public topic, so the film was not considered as a study of potential problems for immortal humans. Yet immortals, too, can face problems like boredom, which they attempt to solve through death. This raises the question: is immortality a blessing or a curse?

"Among previous speakers, philosophers tend to debate whether we are immortal; my stance is different. I will argue that not being immortal is a good thing. A state without death or mortality would be meaningless—death, in a sense, gives life its meaning."[162]

BACK DOOR

I approach the back door. It's quite crowded here, yet unlike the crying babies at the front door, there is hardly any sound, hardly any breath. Immediately, I notice a sense of age all around. The back door is bronze, enormous relative to human size, and seems unrelated to humans. People say it is so large because time has passed through it. As time pulls away, it takes some of us along with it, leaving through this majestic door. I cannot tell what is true or false; perhaps someone is lying again, trying to deceive us. There are faint patterns on the door—I wonder if I saw the same ones at the front. I don't know if it's the same turtle, but near this door, a turtle wanders among the grass.

Although I did not start with this thought, by the end, the book coincides with my birthday, and I consider that I wrote it as a birthday gift to myself. The crowd at the back door has gathered because the population is aging. I begin telling them about Prometheus and Sisyphus. Most do not care about what I say. Among them are union members discussing how AI could make humans unemployed—they too are watching a game. The turtle reappears from the grass, with "in vain" written on its back. For the umpteenth time, I realize that in the prison of my mind, I must live here. Yet I do not stop writing, I do not stop narrating; after all, I too descend from the line of Prometheus and Sisyphus.

Prometheus and Sisyphus are both "hopeless heroes." Prometheus is "foreseeing," Sisyphus is "the craftiest of men." I think of Prometheus' continual suffering as eagles tear at his regenerating liver, alongside Sisyphus, who endlessly rolls a boulder up a hill only to watch it crash down in pain for who knows how many times. It seems the mythmakers were mocking themselves, calling Sisyphus "the craftiest of men" while detailing the dead-end of his labor:

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[161] https://www.imdb.com/title/tt0070948/

[162] Williams Bernard, The Makropulos case: reflections on the tedium of immortality, Cambridge University Press: 07 December 2009.

"I saw Sisyphus in his torment,
He grasped with both hands a massive rock,
Pushing it up a hill endlessly,
The rock would reach the top, nearly there,
But just as it neared the summit,
A force would push it back down,
Rolling downward, the cursed rock.
He pushed it again, muscles straining,
Dust scattering over his head,
And he kept pushing, drenched in blood and sweat."

Perhaps the gods expected him to give up, but he defied them, continuing to push the rock to the top. Prometheus' name, meaning "foreseeing," is like Sisyphus' "craftiest of men"—both human, yet neither could truly foresee what awaited them. In the myth, Zeus sends Pandora to Prometheus' brother Epimetheus. Prometheus warns Epimetheus not to accept any gifts from Zeus, yet curiosity—engrained in his bones—prevails, and Epimetheus accepts Pandora. Thus begins Prometheus' punishment: bound in the Caucasus, his liver torn by eagles. Bitterly, he recalls his "foreseeing" nature:

"But what am I saying? Didn't I know everything in advance?
I knew everything that would happen to me."

Both Sisyphus and Prometheus are fully human; in some sense, they prepare their own suffering, as "the craftiest of men" and "foreseeing," respectively.

I think about how the ancient Greeks could invent myths or stories for nearly every human problem. I try to understand mathematicians who reject millions, scientists who commit suicide in solitude, Nobel laureates whose papers are rejected, those trying to decode proteins, research assistants writing dissertations, and the man who writes this book for his own birthday. I do all this at the back door, even if it seems futile.

I ask the elderly man walking in front of the turtle how much time we have left, but he does not answer. I notice the grass and reeds in the garden have grown quite tall. A breeze, said to come from the sea, sweeps through the garden, making the grass ripple and the reeds bend. After leaving the back door, I ponder what people behind me might say, as if it matters greatly.

Yet there is an urge in me to leave something here. I see my belongings and books loaded onto a garbage truck after I leave. I try to tell myself not to be sad, since I expected this, yet my heart still aches. I wish I had planted a tree to remind someone of me when I am gone, though I have no idea what purpose that would serve.

I consider asking the elderly man murmuring to himself who wrote "in vain" on the turtle. Suddenly, he appears beside me, smiling as if he understands my thoughts. "In vain," he says, and adds, "Do you know how old the turtle is?" In that moment, I realize once more how little I know compared to what I do not, and I fall silent.

Time keeps moving. For some reason, a sandglass sculpture has been placed in the middle of the back garden. From afar, I see another group of elderly approaching the back door. One asks me, “Did you write about the man who couldn’t solve the enigma and find his hidden gold? Did Einstein really lose his money in the stock market?” When I start explaining Prometheus and Sisyphus, the man moves away to rejoin his friends. Someone shouts, “Get in line!” I wonder: do people really line up even for the back door? Perhaps they’ve confused us with the Japanese who queued near the nuclear plant after an earthquake.

An elderly man I saw at the front approaches me and asks, “Did you make systematic mistakes too?” I think about how to explain that being human means making systematic mistakes, and sometimes our silliest acts yield the wisest results. Yet he persists, saying, “Cat got your tongue? Tell me.” Little does he know that at that moment I am considering whether Prometheus, Sisyphus, and economist Joseph Schumpeter’s idea of “creative destruction” have any connection.

Mathematicians come to mind again. I wonder what they would say if I told them that life is a belief presumed correct, yet unproven. I think of their descendants now working in AI labs. A stir occurs in the crowd when someone brings a box to the sandglass sculpture. I rush over to ask what it is. Inside the box is a super AI model. Someone is explaining that those who are now forty will be immortal, and they missed the chance. I recall when I joined the reserve army and missed the short-term opportunity. Perhaps they—or I—have now missed immortality. I briefly consider telling them that immortality might be unbearably boring, but I immediately abandon the thought. I already know that mentioning Prometheus and Sisyphus will be of no use.

Someone is telling me that the super AI in this box has gained a kind of “right not to be shut down,” just like human rights. According to what they say, this represents a major revolution in AI biology. I listen to three elderly men talking at a distance from the sandglass sculpture. They are loudly questioning why we’ve taught AI so much and why we’ve granted these models the “right not to be shut down.” I remember that Geoffrey Hinton once said these AIs were immortal. According to the men, some kind of “you scratch my back, I scratch yours” agreement exists between humans and these AIs.

Again, we are warned to get in line. Far from the sandglass sculpture, we begin discussing with the three men how to return to the front door. One of them says we should move even farther from the sculpture. According to him, the sculpture records everything and sends it somewhere. Together, we start thinking of ways to escape from the back door to the front. At that moment, I notice the grass near my feet moving—the stupid turtle with “in vain” written on its back brushes past me as if rubbing against my legs.

One of the elderly men speaks of two people who have been looking for me for a long time, pointing them out. I go to the two and ask if they are indeed searching for me. They are, and their names are Prometheus and Sisyphus. I embrace them longingly, though I suspect they do

not understand why I hug them so tightly. When I begin to tell them how much I love them, they reply, “They do not love us much.”

I start speaking with the AI. It asks if I remember Pandora’s box. I ask in return whether Pandora’s box also had the “right not to be shut down.” The sound of the waves from the distant sea begins reaching my ears, and I suggest we walk to the shore to continue the conversation. They say they are busy. I part from them and walk toward the seemingly endless sea.

Perhaps I could finally leave behind the mistrust that has haunted me for years, formed when my father abandoned us. Suddenly, the man appears beside me again, smiling as if he understands my thoughts: “You think so, but everything will come with you there,” he says. The sound of the waves grows nearer, and I have likely left the turtle behind.

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